



Methods of Filling Teeth with Gold Inlays.*

By DR. THOMAS P. HINMAN, Atlanta, Ga.

Compound Approximo-Occlusal Cavities in Bicuspid.

Where cavities exist in the mesial and distal surfaces of a bicuspid and it is to be inlaid with gold, the cavity preparation is as follows: Cut away the bucco-lingual and approximal enamel sufficiently to flare the walls clear of approximal contact and to gain easy access to the cavity.

The smaller the neck of the tooth the wider these walls must be flared. Be sure to open the cavity sufficiently, for it is impossible to inlay a cavity with a constricted aperture. With a square end fissure bur, cut the floors flat, at the same time extending the cervical border slightly under the free margin of the gum: the side of this same bur may be used to trim the axial walls, flaring them to the morsal surface. However, I prefer a sharp chisel for this purpose. With the same bur cut the cavities together on the morsal surface along the line of the central groove. Enlarge this groove bucco-lingually so as to give strength on the morsal surface. Be sure to do this work with a fissure bur, for if it is used properly, no undercuts will exist in the cavity, whereas, if round or cone burs are used for this work, there is great danger of leaving under-cuts, which, of course, would prevent an easy removal of the matrix and result

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in ultimate failure of the inlay. Polish all margins; see that no undercuts nor overhanging enamel exists, however small it may be. (Fig. 43.)

Making the Matrix.

average tooth.

In teeth that have been shortened by attrition, the gold may be cut shorter. Anneal and bend this piece of gold in the form of the letter

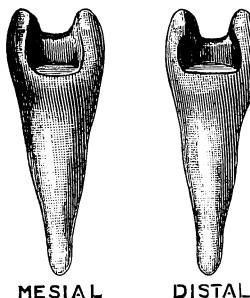


FIG. 43.

Cut a piece of inlay gold one and one-half times the width of the cavity bucco-lingually as long as twice the width of the tooth bucco-lingually. This has been found to be about the correct length for the

FIG. 44.

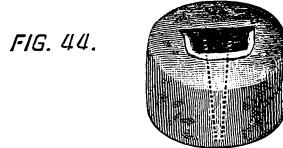


FIG. 45.

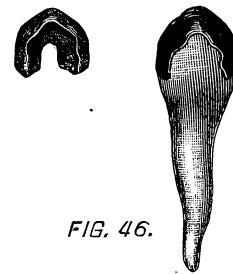


FIG. 46.

U, forcing the free ends down between the cavities and the approximating tooth. The gold should lap the cervical margin well. Force the gold in place with a pledget of wet cotton grasped with a strong pair of plugging pliers. This should be done on both sides of the tooth. The cotton is removed from one side of the cavity and the gold malleted with the orangewood plugger into apposition with the cavity walls. The cotton is replaced on the side thus treated and the other side treated in like manner.

Remove the matrix and trim approximately; reanneal and return to the cavity, placing the wet cotton on one side of the cavity to hold the matrix in position, and burnish to the margins, using a small flat burnisher.

Replace the cotton in the side just treated and remove the cotton from the other side, burnishing these margins. Replace the cotton and with a round burnisher, burnish the gold to the connecting neck. This may be facilitated by the use of the orangewood plugger. Mend tears with gold pellets or scrap foil. Remove from the cavity and thicken with 22K solder, being careful that the solder does not flow over the margins. Trim

the matrix to an even lap about 1-32 of an inch from the margin; return to the cavity and reburnish the margins. Dry the matrix and take an impression in modeling compound (dry heated), allowing the patient to bite into the compound while it is still soft. Press the compound against the buccal surfaces with the fingers, while the patient forces it to the lingual surfaces with the tongue. Chill the compound thoroughly; I use compressed air for this purpose; then remove from the mouth.

If all steps have been carefully followed, the matrix will come away with this impression and bite. Run the model in sump and place in a small crown articulator. Remove the compound, carefully heating it up in warm water, allowing time for the heat to soften the compound thoroughly. Restore the lost parts in hard wax, covering the morsal surface to fit the occlusion. Over the morsal wax burnish annealed .001 24K gold, trimming this contour gold to the margin at top of the matrix, allowing it to come well to the approximal surface so as to carry the solder to a knuckle, for the solder will flow just as far as this contour gold is carried, but no further. Cut the tooth containing the matrix from the model and trim the distal side exactly as desired to have the finished inlay.

With 24K gold 1-1000 of an inch thick well-annealed, burnish over the distal surface, covering the wax and lapping the matrix slightly where it shows on the buccal and lingual surfaces.

Make a small hole in the contour gold on the distal side where it comes in contact with the cusp. Make small roll of wax, placing it in the hole, letting this piece of wax extend distally (Fig. 44). Wet and invest in sump with the wax roll pointing downward. When hard, trim away the model on the underside until you strike the wax roll, then boil out the wax and trim the model as small as practical. The hole left by washing out the wax will allow the air to vent, causing the solder to flow without bubbles. (Fig. 45.) Flush the matrix with creamed borax, using a camel's-hair pencil to carry the flux to place. Fill with 22K solder, cutting it up in pieces about 1-16 of an inch square; drop some of these pieces of solder in the mold before heating up. Heat up from below and draw the solder down to the vent with the blow-pipe. This is done by keeping the flame on the under side of the investment, until the solder melts; add more solder, and when the matrix is half filled, the flame should be used from above. When the solder has been flowed flush with the cusp margin, it will be found sufficiently full. Allow the solder to congeal, then plunge into cold water to soften the investment. Clean and pickle in an acid bath. Trim approximately and fit in place in the mouth. If sufficient knuckle has not been secured, it can be added by sweating more solder on the inlay at the desired point. Finish the approximal surfaces before setting with cement, leaving only a slight marginal lap of the gold.

Roughen the inner surface of the inlay with a small bur and set with cement. Just before the cement has set, go over all the margins with small flat burnisher. Polish and finish as for any gold filling, using strips to finish the cervical margins. (Fig. 46.)

In mesio-distal occlusal cavities in bicuspids, where the cusps are *almost destroyed or where the buccal and lingual walls are very frail*, the cavity preparation is as follows: Grind away the lingual cusps as much as is necessary to prevent occlusion by

1-16 of an inch, then with a stone cut away a small portion of the cusp tapering from buccal to lingual, preserving as much of the buccal enamel as possible, so that in the finished inlay, little gold will show buccally. The basal walls of both the mesial and distal cavities are made flat with a square end fissure bur and the axial enamel walls cut so as to have sufficient cope to draw easily.

Flare the axial enamel walls well to the lingual and buccal surfaces. Polish the margins with a cuttle-fish disk being sure that no sharp angles remain to cut the matrix. (Fig. 47.)

In bicuspids where the pulp is dead and the tooth has extensive mesial and distal cavities, I always cut the cavities together and treat as heretofore described. The reason for this is that frequently where extensive caries has taken place in the upper bicuspids, and the fillings or inlays are not made to include the cusps, the tooth is very liable to fracture under the stress of mastication. It has been my observation that the lingual cusp fractures more frequently than the buccal.

After the cavity has been prepared, as described, the next step is the making of the matrix. A piece of 3-1000 24K gold is cut the proper size and annealed; bend in the form of the letter U and place in position so that it will straddle the cusp mesio-distally and pass well up between the cavities and the adjoining teeth so as to cover well the cervical margins.

This is forced to place by a large pledget of cotton placed on both sides of the matrix, considerable force being used on the pliers to carry the cotton down into the cavity, forcing the matrix to the cavity walls and well over the cervical margin, lapping the buccal and lingual walls about 1-16 of an inch.

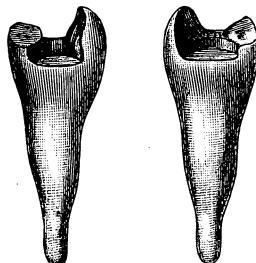
It is always best to use a piece of matrix metal much too large, than the least bit too small; a good rule is to have matrix metal 1 1-2 times as wide as the cavity, measured bucco-lingually. The wet cotton is now malleted with an automatic mallet, using a piece of orangewood as a plugger. This drives the matrix to an approximate fit. The cotton is re-

**Making the
Matrix.**

moved from one side of the cavity and the matrix is then swaged against the cervical wall with the orangewood plugger.

The axial margins are carefully burnished with a small flat burrisher. The same process is now used on the other side of the cavity. The matrix is removed and trimmed with a pair of scissors to within $1\frac{1}{32}$ of an inch of the cavity outline which shows plainly on the matrix.

The matrix is then reannealed and replaced in the cavity and burnished carefully to an exact adaptation to the margins. Remove carefully and thicken the mesial, distal and coronal surfaces with 22K solder,



MESIAL DISTAL
FIG. 47.

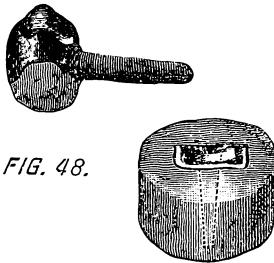


FIG. 48.

FIG. 49.

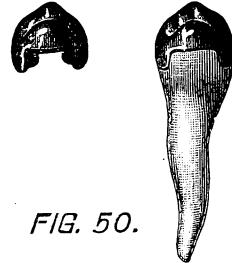


FIG. 50.

being careful not to let the solder run over the margins. Replace the matrix in the cavity and go carefully over all the margins with a flat burrisher, and with a round burrisher on the coronal surface. Dry the surface of the matrix thoroughly, take a piece of modeling compound, soften over the Bunsen burner or alcohol flame and press into the cavities well up between the teeth, allowing the patient to bite on the compound, closing the teeth to full occlusion. Chill the compound thoroughly and remove from the mouth. If all steps have been followed the matrix will come away with the modeling compound, thus insuring the retention of the shape of the matrix. If the matrix does not come away with the compound, one of two things has occurred.

First, the cavity has not cope enough to draw or the gold matrix was wet when the impression was made. Run this impression and bite in sump, placing it in a small crown articulator. Remove the modeling compound (care should be taken to get the compound extra soft). Proceed to swage a suitable cusp of 36 gauge 24K gold, trim, and articulate to place.

This cusp should be wide enough mesio-distally to make the necessary knuckle. Wax this cusp in place and then cut the tooth, holding the



matrix and cusp from the model. Wax and trim the mesial and distal surfaces, just as you wish them to be in the finished inlay. With 24K gold 1-1000 of an inch thick, well annealed, burnish over the distal surface, covering the wax and lapping the matrix slightly where it shows on the lingual surfaces. Make a small hole in the contour gold on the distal side where it comes in contact with the cusp. Make a small roll of wax, placing it in the hole, letting this piece of wax extend distally (Fig. 48). Wet and invest in sump with the wax roll pointing downward. When hard, trim away the model on the under side until you strike the wax roll, then boil out the wax and trim the model as small as practicable.

The hole left by washing out the wax will allow the air to vent, causing the solder to flow without bubbles. (Fig. 49.)

Flux the matrix with creamed borax, using a camel's-hair pencil to carry the flux to place. Fill with 20K solder, cutting it up in pieces about 1-16 of an inch square. Drop some of these pieces of solder in the mold before heating up. Heat up from below and draw the solder down to the vent with the blow-pipe.

This is done by keeping the flame on the under side of the investment until the solder melts.

Add more solder and when the matrix is half filled, the flame should be used from above. When the solder has been flowed flush with the cusp margin, it will be found sufficiently full. Allow the solder to congeal, then plunge into cold water to soften the investment.

Clean and pickle in an acid bath. Trim approximately and fit in place in the mouth. If sufficient knuckle has not been secured it can be added by sweating more solder on the inlay at the desired point.

Finish the approximal surface before setting with cement, leaving only a slight marginal lap of the gold. Roughen the inner surface of the inlay with a small bur and set with cement.

Just before the cement has set go over all the margins with a small flat burnisher. Polish and finish as for any gold filling, using strips to finish the cervical margins. (Fig. 50.)





The Influence of Heredity on Malocclusion.

By WILLIAM J. BRADY, D. D. S., Iowa City, Iowa.

Read before the American Society of Orthodontists, Chicago, January, 1906.

There is no part of the science to which we are devoted that is more interesting than the influences that inheritance may or may not have in the production of malocclusion. There is perhaps nothing in orthodontia that requires a deeper insight into the workings of nature and the mysteries of life itself in order to speak with authority, yet there is no part of our science concerning which more loose statements have been made, and many assertions have been accepted as correct that are in direct conflict with clearly established truths.

Some of the assertions which are unwarranted by facts have been made from little knowledge of the subject in any way; some from a misinterpretation of common facts whose true meaning may be easily arrived at; others from plain "jumping at conclusions" simply because a thing *seemed* to be so; and still others (and probably the greatest number) are from an examination restricted to the human race alone, in which the workings of Nature in other fields are passed by and the fact is ignored that Nature's laws are general and affect every living thing, and that she does not make exceptions for the animal, man, any more than she does for the humblest insect.

It is impossible to consider more than a small part of this vast subject in a single article, and the writer makes no claim of authority, nor

that his word is final. Our ignorance of Nature's ways and Nature's laws is too great for us to say that this or that is established from the observations or reasoning of any one man. In commenting on what has been said by others on the subject, all due respect is intended, for no doubt each contributor has said only what appeared to him to be the truth according to his views. Such facts and arguments as may be presented are offered with a sincere desire to arrive nearer the truth in the case, and must be judged as all others should be, entirely according to the light that the knowledge of the times affords.

**Heredity and
Environment
Defined.**

Before entering into any discussion of the subject, the underlying truths that have been established should first be enunciated. It is one of the most universal facts in Nature that every living thing from the highest to the lowest is subject to the action of two never-ceasing forces; the tendency to resemble the ancestors from which it came, and the tendency to be influenced more or less by its surroundings. The tendency to resemble ancestry is called heredity, and a character or condition that appears prominently through a series of generations is said to be hereditary or inherited. The surroundings of an organism are called its environment, and include every possible condition which might have any effect upon its development, such as food, climate, light, air, moisture, heat, cold, cultivation, artificial benefits, natural enemies, companionship, mental condition, method of living, exercise, in fact, any and all things capable of exerting any influence for better or worse.

These two forces operate entirely according to natural laws, concerning which our ignorance is most profound. In fact, we comprehend only a few of the most easily recognized details and have only the most general knowledge of the workings of these forces which influence all life. However, our knowledge of these general laws may be of great service in solving some of the problems of orthodontia if reasonably and intelligently applied. A few of the important general facts applying to the influences of heredity and environment have been selected, and their elaboration and application to orthodontia will now be attempted.

**Limitation of
Heredity.**

While the influences of heredity and environment extend to all life, yet there is a limit to the effects of each tendency. It is well known that while heredity tends to produce offspring resembling the ancestors, yet there is a certain amount of elasticity in the rule. Like produces like, but not exactly like. The likeness never amounts to identity, even in the closest resemblance; there is always some variation. This variation may become intensified by environment, and by long repetition of the intensifying process the changed conditions become regularly repro-

duced and thus hereditary. It is upon this fact that the many varieties and species occurring in all life depend. The influence of heredity never allows a violent change, however, nor a wide departure from any established form. There is a limit to the exact resemblance maintained by heredity, and also a limit to the change that may be produced.

The influence of environment is likewise marked by bounds. Environment influences all growth and development, yet the surroundings will never change an organism from one type to another, at least not through any period of time with which we have to deal. No amount of cultivation will change the cactus to an oak tree, though it may be robbed of its thorns and made a useful plant of the garden instead of an outcast of the desert. Goldfish of many varieties have been produced by patient selection and breeding; yet the goldfish will never be anything but a fish—never a bird nor a mammal. Yet on the other hand the influence of environment affects every form of life in some degree, and may affect it more in a short time than we are aware. No man is wise enough to predict the effects of environment if continued through eons of time, and no man lives long enough to observe more than a very little concerning the limits of either environment or heredity.

When we begin the study of any organism, we should first consider the conditions under which that organism as a whole rose to its present form, and then whether any particular part is the regular product of long inheritance or the result of some recent environment. It will not do to take for granted that things are in their normal condition just as we find them. It must be remembered that any form of life which we investigate has been in existence for ages, and that we as individuals are very late arrivals on the scene.

**Reversion to
Type.**

Not every condition we find is the result of heredity. A like environment may hold an organ to a like condition for successive generations instead of heredity being the compelling cause. When this changed environment is relinquished, heredity quickly changes the organ back to the old form, and holds it there again perhaps for centuries with only such permanent variations as the force naturally allows. Heredity is the force that holds all life to its true forms through the ages, and its power is not set aside in a few years even under an intensely changeable environment. The influence of heredity must not be judged by the condition of a few individuals nor a few generations even. All this is seen in many common instances. The farmer must keep continually selecting and improving the seed for his crops, or they soon run down both in quality and in yield. This is simply an exhibition of the power of heredity asserting itself on the least relinquishment of an artificial environment, the



grains tending to return to the original wild forms whence they came, and to what was their normal condition for untold centuries before man began their cultivation. The rose when deprived of the loving protection of man becomes a wild rose again. The \$30,000 Lawson pink becomes a ten-cent carnation if left to itself.

The same thing is seen among domestic animals. Our improved cattle must constantly be kept up by selection and infusion of new blood, or the quality deteriorates and scrub cattle result, a return toward the primitive forms of ages ago, and the return is vastly more rapid than the advance. This same thing is seen on every hand, and the same results are obtained by every like experiment. Whenever environment relapses to a former state and artificial selection of sex or condition ceases, heredity asserts its power by a return to the condition under which the type of animal or plant was established, and which, speaking in a broad way, may be considered its natural or normal condition.

**Results of
Normal Modes
of Living.** Applying these facts to orthodontia, it will be seen that some of the existing ideas concerning mal-occlusion are in direct conflict with these truths, which it would seem are so plain as to admit of no

question. When we survey man's progress in the animal world, it is beyond question that we are not living the life to-day that man followed when the race rose to its present form. Man has changed his own environment, and has changed it rapidly. During the last twenty-five to forty centuries, man has made more change in environment than any other organism has ever experienced even through a geological age of hundreds of thousands of years. The normal life of man is far from the strenuous struggle of to-day.

The things that bring out his best development are an out-door life just active enough to insure plenty of exercise and requiring sufficient thought to promote mental development, combined with a considerable variety of food suitable for his nourishment, requiring some effort to obtain, and needing considerable preparation in the form of mastication and digestion before being ready for assimilation. These things promote to the fullest degree the development of a well-balanced man, and whenever these conditions obtain there is but little need for either physician or orthodontist. Any nation or people that follows a life of this kind shows well-developed jaws and dental arches, and well-formed, strong and regular teeth.

It hardly seems necessary to multiply instances of this fact, yet we may point out many cases. Many European countries have a large population living practically the normal life, and their development shows it. The Germans have a large percentage of people noted for fine physique;

the Poles, Bohemians, and Austrians of outdoor growth are well-developed, and irregularity among all these is uncommon. The Scandinavians are noted for their beautiful complexions and well-formed persons, and all those of country life have beautiful and regular teeth. The people of the Caucasus, the Armenians, the Georgians, the Arabs, many of the Turks, the Afghans, the Cossacks, most of the Russians, all notably lead a simple outdoor life, and all are noted for perfection of physical development, which almost invariably includes teeth of practically perfect arrangement.

Nor is the rule applicable to the white races alone. The Chinese have a large population living an outdoor life, and their jaws are ample and their teeth well arranged. It is the impression that the Chinese are a people rather under the ordinary stature, but those from the strictly agricultural districts have a large proportion of six-footers. Large size of body, however, is not necessary for proper development of the jaws and regularity of the teeth. The Japanese are a people of small stature, yet their teeth are practically regular. The nature of their country and its resources demands a simple life, and the result is a people who have astonished the world for energy, endurance, and intelligence. Most of the Malays live a healthful outdoor existence, and these are noted for courage and physical endurance. Their development is fine and attractive, including good teeth, well arranged.

The North American Indians are—or rather were—particularly noted for fine physique and regular teeth. This is true of the very early Indians as well as since the white man's coming. The author has had opportunity to examine skulls from mounds that date back many years, and they had finely developed dental arches, and good teeth that showed hard usage.

Even the inferior black races show regular teeth under their regular environment. The Kaffirs and Zulus have finely arranged teeth. The natives of Central and Eastern Africa are prized as slaves by the Arabs, and many are carried to the observation of the white man, where their good teeth are noted by all observers. Even the degenerate Hottentots and Bushmen have the jaws well-developed, and their teeth are not crowded.

The Eskimo lives under an unfavorable environment that dwarfs both his body and his mind, yet he is compelled to use his teeth much, and his jaws and dental arches are well developed. While these instances from foreign lands are given, yet it is not necessary to leave our own country for numerous examples. Wherever the population is reasonably settled in an out-door life of the normal character, the percentage of irregularity is low.

**Malocclusion and
Abnormal Modes
of Life.**

It is where the environment is abnormal that malocclusion flourishes. Nor is it to be wondered at. We struggle through life day by day—we do not quietly live, but struggle at everything. We try to do twelve hours' work in six, and the work of two days in one. We start our children to school too early, and crowd them all the time while there. In our schools and colleges we lengthen the courses, increase the requirements, and shorten the time. Boys and girls are in society at sixteen instead of in bed o' nights. The nervous system is always stimulated and never rested. Even in our play we struggle. We make a business of playing golf instead of a pastime. The baseball game is not a period of relaxation, but of keen anxiety as to whether the home club will win, or the favorite player will raise or lower the batting average. We have records to smash in everything—all must be hurry, noise, and excitement. We kill each other with dynamite crackers on the 4th of July, and yell ourselves hoarse when husky young collegians smash each other flat at the Thanksgiving football game. All nerves are kept keyed to the highest pitch—no wonder the strings occasionally snap and the beautiful human instrument gives music no more.

We are no more careful of our digestive organs than of our nerves. Our food is prepared to please the palate rather than nourish the body. It must be quickly cooked even though its value as food is lost. Lime salts and phosphates are carefully sifted out, and glucose, starch and salicylic acid carefully sifted in. Our groceries are adulterated, our meat embalmed, our butter renovated. Everything is prepared, canned, condensed. We hurry through meals and rush to work again, while the beast does better than we, for he lies down and rests while digestion progresses. We choose soft foods, and carefully set aside things that require heavy mastication. Tommy and Susie do not like crusts, so they do not eat them. It is not real nice to chew away on tough things, and decidedly impolite to gnaw a bone.

In short we over-work and over-worry, over-eat and under-sleep. We have no real rest nor relaxation, and tear down as fast or faster than we build up. The simple life is left to the "Reubens" and "Jays", but we are the real Reubens in the case. With all outdoors before us to live in and all the blue sky to cover us we crowd ourselves together in cities and live in dirt and discomfort, and shut out the sunshine with a pall of smoke. We live amid shrieks, toots, bells and yells; we dodge trolley cars and automobiles, move from flat to flat, and never know what peace and quiet means till we are in our graves, and only then because they take us out to God's own green country to sleep.

With all this is it a wonder that we are deficient in physical development, that our bones grow only enough to accommodate the light muscles that form, that food fails to nourish, that digestion is poor, that thorough mastication is not practiced, that jaws are small and dental arches crowded; that adenoids, catarrh or other hypertrophies and degeneracies are prevalent; and that more or less lack of development of all the structures of the face, jaws, mouth and teeth is the rule and not the exception?

**Environment
the Chief Factor
in Abnormalities.**

We have made a mistake in ever supposing that heredity tends to promote this abnormal condition—the tendency is all the other way. Heredity always tends to promote the normal, the healthful, not the abnormal or diseased. If a similar condition exists in parent and child, let us not jump to the conclusion that the defect is inherited, but rather let us investigate the environment. If we find contracted dental arches in the same family it is a sign that all members have lived upon the same kind of food, and all have failed to give normal exercise to the teeth and jaws. If nasal or pharyngeal hypertrophies exist from one generation to another, we will find the environment is inherited rather than the disease. We will likely find the same dry and overheated rooms, the same dust and multitudes of bacteria, the same exposure from heat to cold and cold to heat on going and coming from school, the same lack of exercise requiring deep breathing, the same general surroundings both from parents to children and from one child to another. If a certain tooth, as say a cuspid or lateral incisor, is malposed from father to son, the mechanics of eruption of the teeth should be studied instead of laying it to heredity, and it will be found that there is a general condition covering this case that applies to the entire human race.

Aside from the fact that heredity promotes the normal instead of the abnormal, it is also very questionable if a feature like malocclusion can be transmitted at all. A violent change is much less likely to be transmitted than a slight one, and a bad case of malocclusion is certainly a great change from the normal. Weismann, the great writer on heredity, gives it as his opinion after years of observation that only slight acquired conditions are ever transmitted, and scientists are very cautious as to their statements of what changes may become hereditary and what may not. Such conditions as cleft palate, club feet, or a sixth finger or toe are no greater departures from the normal than many cases of malocclusion, yet we do not expect these abnormalities to be transmitted, and they rarely if ever are.

We have been wrong not only in supposing that heredity tends to promote or transmit malocclusion, but in believing that heredity influ-



ences the development of the dental arch at all. Heredity gives us a certain number of teeth, the same as it gives us two legs and two arms, or eyes, ears, liver, stomach, etc. Heredity also influences development of these teeth in the same way and at about the same time in all individuals, and further disposes them in practically the same fashion in the jaws of all children, whether their parents are white, black or yellow. Heredity to a large extent controls the time of the loss of the deciduous set and the eruption of the permanent, but when the permanent tooth starts on its journey to its final resting-place in the dental arch it is the creature of environment from then on. The slightest thing may influence its travels; a spicula of a former tooth, a slight contraction of space, a check in general growth and development at this time, or most likely of all, a lack of ordinary use. The dental arch has a definite development of its own as well-marked as growth of a grain of corn which has first sprout, then root; then leaves, then stalk; followed by flower and finally by the perfect fruit.

Development of the Dental Arches.

The dental arch has an enlargement equally as definite as the plant, as tooth after tooth is added, and whether this enlargement shall be perfect or not depends on whether the means Nature has provided to secure this end are employed. Each permanent tooth as it erupts travels outward from a common center that it may occupy a place in a larger arch than that needed to accommodate the temporary teeth. Its journey is not over in a few weeks nor months, but it gradually moves outward for a long time after eruption as well as some time before eruption. In fact, the enlargement of the dental arch extends from before the time of eruption of the temporary teeth until the appearance of the third molars, a period of nearly twenty years, and all the teeth are gradually moving outward and the arch attaining full size through all this time.

Nature depends on three forces to accomplish this proper development, two of which tend to force the teeth outward to the proper place, and one which tends to keep them from going too far, namely—the action of the tongue and pressure from mastication to promote outward movement, and the action of the cheeks and lips to press inward at all times and prevent the arch from spreading beyond its proper bounds. Between these forces the formation of the dental arch is balanced, and a very little sometimes decides whether it shall reach full size or not. The action of the cheeks and lips limits enlargement of the arch to less than full size unless the enlargement is forced by greater pressure outward than that exerted inward. The action of the tongue in pressing outward is possibly greater than we have credited it with—J. Sims Wallace

assigns it the power to prevent or produce nearly all irregularity—but it is easily seen that mastication must be the chief influence depended on to gain a full enlargement of the arch. This is accomplished in two ways; the lower jaw swings from side to side, and the cusps of the upper teeth interdigitating with the lower are dragged outward by this swinging motion, and each then further reacts on the other. The peculiar mechanics of the case favor an outward movement of the teeth more than an inward.

But the greatest factor in the development of the dental arches comes from the stimulation to the parts that normal use gives, and it is from this that normal growth is most promoted and finally attained. Nature intended the teeth to be used and used hard. Their function is to incise, to tear, to grind, and they normally should receive a pressure of a number of pounds in this action. Pressure upon the teeth means pressure on the periodontal membrane and bony tissues of both alveolar process and maxillary bones, which pressure means proper stimulation of the nervous elements of the part to do their duty, and this in turn means blood supply, nutrition, growth. Lack of full use of the teeth means lack of these things, and the everlasting inward pressure of the lips and cheeks is not counterbalanced nor even equaled, and contraction of the arch results. Over 90 per cent of the orthodontist's cases require expansion of the arch, and over 50 per cent are entirely due to failure of this normal enlargement of the arch from lack of pressure from mastication or action of the tongue. As malocclusion from nasal and pharyngeal hypertrophies makes up fully 75 per cent of the grand total, and as nearly all of the remaining 25 per cent is due to the simplest of means, the great mystery of the causes of malocclusion shrinks from a monster to a mite.

We have been wrong on the tendency of heredity, and we have been wrong in the belief that the size of the dental arch depends upon the size of the jaws. It may seem like heresy to say it, yet the size of the jaws is influenced by the development of the dental arch rather than the reverse. There are many plain instances of this. In retrusion of the lower jaw, the bone is retarded noticeably in its development in direct proportion to the retrusion. The occlusion of the teeth steadily forces the lower jaw back through a series of years, and this results in a shortening from lack of growth. This lack of development occurs in the ramus and the posterior third of the body of the bone. If the retrusion is on one side only, the jaw is noticeably shorter on the side of the retrusion, as may be proved by measurements both upon the living subject or from skulls. If the retrusion is on both sides, development is checked in each half of the jaw; and gives rise to the well-known receding chin. The mental



eminence is developed the same as usual, and the arrest of growth is easily located in the posterior part of the bone by comparison with a normal skull.

The upper jaw is noticeably checked in its development from lack of use of the teeth, as is proved whenever the occlusion does not permit their full use with consequent pressure upon them. We invariably find with a considerably contracted arch a restricted nasal passage and more or less lack of development of all the facial bones. We also find that we may stimulate their growth to a marked degree by correcting the mal-occlusion and bringing about pressure upon the parts. The degree to which growth and development may be secured in cases of this kind is a physiological fact of vast importance, and which as yet we little appreciate.

While the size of the jaws is affected by the development of the dental arch in the cases cited, yet under normal conditions the growth of each is practically independent. The teeth migrate just where the mechanical forces of mastication force them, and the alveolar process follows and is built up around them wherever they may go. The writer has many skulls in which all sorts of conditions of this kind may be seen, and there is no direct relationship between the size of the jaws and the size of the dental arches. Some of the smallest bones support arches of the largest size, and the teeth therein are well arranged, showing evidences of good hard usage from their wear. The skulls of Indians, mound-builders, cannibals, white men, black men, cliff-dwellers, or Eskimos all show dental arches developed to full size, built up on jaws of widely different types and sizes, and showing an arrangement and size of arch exactly according to the use that had been given them. While the writer can only give his word for this in this paper, yet his own collection and the museums of the State University of Iowa and the Iowa Historical Society can furnish ample proof if the matter be doubted.

It is thus seen that while heredity may pass along a similar osseous framework through successive generations, it by no means follows that malocclusion travels the same path. The dental arch depends for its development on the use that the individual gives it, not on some condition of his ancestors. This statement could be verified by innumerable examples, both in the case of man and many of the lower animals, but space forbids further amplifying and those to whom this seems reasonable may accept it as correct, and others are privileged to think it yet unproved. The future will settle the matter in its own good time.



ORTHODONTIA

Ancestral Characters Blend.

The writer would be derelict in his duty if he did not bring up for discussion the time-honored delusion of the inheritance of small jaws and large teeth or vice versa from different ancestors, near or remote. Of all the fallacies that have been seriously discussed in orthodontia, this is the most absurd and has the least scientific foundation on which to rest. It is in direct conflict with many of Nature's best known and most widely applicable laws, and the time has come for it to be shelved along with belief in witches or infant damnation.

It is contrary to Nature's laws to directly transmit features of one ancestor without modification in some way by influence of the other. In case of two dissimilar ancestors, the resulting progeny is always a blend, showing some of the characteristics of both progenitors. This is true not only throughout the animal world, but in the vegetable world as well. A cross between a draft horse and a racer will not give an animal with the forelegs of a trotter and the hind legs of a draft animal; a blend of both ancestors will be seen. A tall father and a short mother do not have children with one long arm and one short arm, neither will one blue eye and one black eye be inherited from parents with these different characteristics. Yet these things would be the rule if the principle of small jaw and large teeth inheritance was correct. When vegetables of different characters mix, as the pumpkin and the watermelon, the resultant vine does not bear the fruit of one and the leaves of the other; the features of both are combined. In the same way any intermixture of the human race produces a progeny of blended characteristics; instance after instance may be cited, and all would prove the same point, and also prove that the idea of inheritance of the teeth of one parent and the jaw of another was an unwarranted assumption in the first place, and has only been promulgated or tolerated through common ordinary ignorance.

In closing this article it should be said that we have taken too much for granted just because somebody said it, or it was printed in a book. The book of Nature is the library to consult though the pages are not always illustrated and they contain problems to solve as well as stories to read. In this book the chapter on Heredity is written in a strange language, yet little by little it is being translated to our own. This much we know already; we have sadly misjudged this mighty force at times, and have even charged it with crimes of our own creation. Heredity is the balance-wheel of all organized existence, the friend of all life and the foe of nothing but the abnormal.



Discussion.

I would very gladly believe that heredity has nothing to do with malocclusion, if possible; however, I feel that the doctor has put it very well when he states that two forces are acting on every living thing, the tendency to resemble its ancestor, and the tendency to be influenced by environment. We know environment has a great deal to do with development.

Let me cite a condition which makes me think that environment has something to do with development, and also that heredity has something to do with development. If you will look at me you will notice that my arms and legs are short, but my body is long. My father had the same build. He was brought up in New England, and worked in the cotton mills, and did not get his growth as he should have got it at some other employment. I have inherited the same type of body and legs and arms, and was born in Michigan, and brought up in Ohio. My boy shows the same characteristics, and you can not convince me that heredity has not something to do with it. Environment has helped me some, as I did not have to work in the mills, and my stature is greater. My boy appears to show greater strength than my parents told me I showed. He has every opportunity to get into the open air. I believe, as the doctor has stated in his paper, that heredity seems to have a tendency to bring back normal forms. Nature does try to produce harmony. If you keep up a better environment you may get back to better conditions.

I believe that we can inherit malocclusion, but I do not believe that we will inherit malocclusion that is worse than that of our parents or ancestors. The case may be an aggravated or an acquired condition. If environment has so much to do with malocclusion why do we have this strong tendency to return to the original condition when the retainers are removed? If you can get a good occlusion of the teeth you will get a good retention.

I think the doctor has taken a rational view of the matter, and that the tendency is to re-establish the normal; however, I think that we may have both conditions at the same time.

We all seem to have been puzzling our heads, **Dr. Edward H. Angle.** during the past year, over this same subject—Heredity, and I fancy it was provoked by some of the "old schoolers" in their using that wise old saw for about the three-millionth time about the "child inheriting the large teeth," etc. I can't bear to go any further with it, but you all know the rest of it. Of course the few remaining members of the old school will doubtless go on



repeating it for it has been demonstrated that they are incurable. But seriously, if Dr. Brady is wrong, I am wrong, for he has written what I believe, only he has written it better than I could write it. It seems to me that it is the clearest, most logical, most sensible, most practical way of looking at the question that has ever been written. It is robbed of all those mysterious, high-sounding phrases that are so often used to hide ignorance and fraud behind in the discussion of questions, and especially of this one. I believe that what he has said is true. Every paper Dr. Brady gives us is fine, but this is, I think, exceptionally fine because it is exceptionally true, and I am proud of it.

Dr. Albion G. Danforth, I have a niece now two years old, but from the time she was six months old she has shown very marked characteristics of the third class. Her father's mother has the same condition, and it appears in four of the father's family, and it has appeared in this little girl, being very strongly marked at two years. She has never been sick a day, and I do not know what would cause it.

Dr. Brady. The matter of heredity has been so thoroughly gone over in the preceding papers, and so thoroughly discussed that there is seemingly but little to say that is safe to say. I possibly did not give the exact shade of meaning in the paper that I should to indicate that the subject must be considered in a broad and general way, and that final results are what we must study and judge from. We can not depend upon a few individual examples to really see the working of heredity. Heredity always tends to return a variation to an established type, and it takes much intensification of the variation to result in something permanent.

We have in the past spoken of malocclusion as though it could be and is handed down by heredity like a wedding garment. It is nothing of the kind, and even if it were apparently handed down for one or two generations it could not thereby be counted permanent. The tendency of heredity is always back to the normal, and until malocclusion becomes so established as to be the usual or normal the action of heredity will never be to transmit it permanently. And malocclusion will never be established as the normal, for malocclusion means disuse, and Nature suppresses a disused organ. Hence if there is a constant tendency to malocclusion for untold centuries from now on, Nature will find relief by reducing the number of teeth rather than establishing an abnormal arrangement of them. This has been her remedy for such conditions since life first began, is her remedy now, and will be her remedy for all time to come.



One of the clearest statements regarding heredity I think ever made is by Orton, the zoologist, and is this: "The laws of heredity are unknown." That is certainly clear and definite, and what is more, it is the truth. We do not know heredity's laws; we know a few of their manifestations, a few simple things we are able to see and handle and measure, but the actual laws governing heredity are still mysterious as the space beyond the stars.

[Dr. Brady, in his paper, states that "neither will one blue eye and one black eye be inherited from parents with those different characteristics." A brief statement as to odd eyes in animals may be excusable. The normal white cat has either orange eyes or blue eyes, the latter preferred because of their beauty. Yet a certain prominent breeder of valuable Angora cats, has for her breeding stock a pair of white cats each of which has one blue and one orange eye. The kittens from this mating have in the majority of cases had perfect blue eyes; others perfect orange eyes, and only a few have been born with odd eyes. But even these few odd-eyed kits can not be used as evidence of an inherited abnormality, because curiously enough no other but white cats are ever born with odd eyes; and the proportion of odd eyes in this particular cat family is really less than the normal ratio for the breed, while the proportion of blue-eyed animals has been much greater than normal.—EDITOR.]

The Importance of Preliminary Examination of the Nasal Chamber in the Treatment of Dental Irregularity.

By FRANCIS ASHLEY FAUGHT, M. D., D. D. S., Philadelphia, Pa.
*Assistant to the Professor of Clinical Medicine, Medico-Chirurgical College.
Attending Physician to Lincoln Day Nursery, etc.*

The frequency of deformity in the dental arches, particularly that condition known as contracted arch, in conjunction with obstructed respiration, due to reduction in the respiratory space within the nasal chambers, and in the naso-pharynx, has been very forcibly impressed upon me during the past few years in my work in the Hospital Dispensary and during the examination of children for admission to a day nursery.

If we consider the mechanical forces active in the production of the contraction, we can not fail to realize the importance of taking into account the frequent coincidence of these two conditions. This surprising frequency can hardly be considered pure accident, but is suggestive of a

probable relation between the two conditions. This probability is advanced almost to a certainty, when from a physiologic standpoint we consider the mechanics of the muscle forces incident to nasal obstruction and the resulting mouth breathing.

During quiet nasal respiration the lips are closed, the teeth of the opposing jaws are in contact, and the tongue closely applied to the palatal vault and to the inner aspects of all the teeth. In this position the muscle forces are in a state of equilibrium, by which the teeth are maintained in their proper relations one to another. The muscles of the tongue on the one hand and those of the lips and cheeks on the other, exert equal pressure upon each side of the dental arch.

In the presence of nasal obstruction and the resulting mouth-breathing the mandible is depressed, increasing the tension of the tissues and muscles of the cheeks, the lips are parted and the tongue separated from the roof of the mouth and from contact with the inner aspects of the teeth. In this position the normal equilibrium is disturbed and unequal forces are brought to bear upon the teeth and the dental arches.

The logical result of this disturbed equilibrium follows. From lack of support on the inside and increased pressure from without, the tendency of the bicuspid and molar teeth is inward. Simultaneously pressure is brought to bear upon the anterior teeth, as a direct result of the lateral contraction, and in the absence of normal restraint from the lips, the anterior teeth advance and result in protrusion.

When we further consider that these forces are active, even in moderate degrees of obstruction, for at least one-third of the twenty-four hours, the strength of this power becomes evident, while in those cases where nasal respiration is impossible, and the disturbing force is continuously active, we are brought to realize even more forcibly the strength of the distorting power with which we have to deal.

Under these circumstances all efforts directed toward correcting the oral deformity will be constantly antagonized, both during the period of active treatment and subsequent to the removal of all appliances from the mouth. The result under these circumstances will in many cases be failure to attain a permanency, the extent of return of the original condition depending upon the degree of nasal obstruction and the age of the patient, it being greater in cases of marked stenosis and in young children.

**Nasal
Examination
Recommended.**

irregularity.

This brief consideration of the state of affairs existing in many cases of contracted dental arch, indicates the importance and value of recognizing the probable co-existence of intra-nasal deformity and obstruction in many, if not in all cases of dental

I believe from the standpoint of the rhinologist, that it is not going too far to state, that a thorough intra-nasal examination is indicated and should be required in all cases presenting oral deformity, and that the time has come when all who undertake the correction of irregularities of the teeth should be familiar with the anatomy of the nasal chambers and with their gross pathological changes, and should possess a working knowledge of the signs and symptoms of these conditions. For it is only by aid of this knowledge that he will be able to detect their presence, to note the frequency of this coincidence and to realize the importance of their relation.

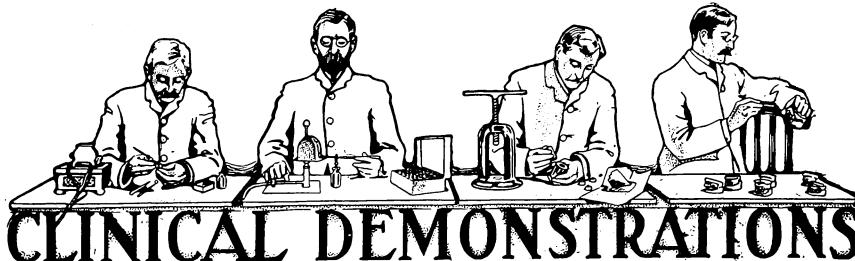
It is not too much to expect the competent practitioner of dentistry to be able to test the functional capacity of the nose in patients presenting for treatment, and to question the patient or parent concerning possible disease within the nose. Such data can be gathered in a very few minutes and, properly used, will quite accurately determine for or against the necessity of preliminary treatment at the hands of the nose and throat specialist.

The occurrence of even a single one of the recognized symptoms of nasal obstruction should be enough to arouse suspicion and call for a thorough examination.

Symptoms of Nasal Obstruction. Briefly enumerated the signs and symptoms to be looked for are as follows: Most frequent and most characteristic is *mouth breathing* during all or part of the time, with *noisy respiration* or actual *snoring* at night. *Restlessness* during sleep with a tendency to *awaken* and call for water to relieve the extreme *dryness of the mouth*. Advanced cases will show a *characteristic face*, easier to recognize than to describe, with *blunted mental activities*, *backwardness* at school, from no apparent cause, and more rarely a history of *nocturnal enuresis*, or *night-terrors*, may be developed. *Chronic cough*, which is slightly productive and which becomes worse in winter and during periods of damp weather is present as a rule.

As already stated, a knowledge of the fundamentals of rhinology, so far as anatomy and symptomatology go, will prove of great value to the dental practitioner who is active in the field of orthodontia. Such knowledge intelligently applied will surely add to his measure of success in this particular field of dental science.

The difficulties in the way of acquiring such a knowledge are not great but are within the reach of all who are willing to study and investigate this important and fascinating branch of medicine.

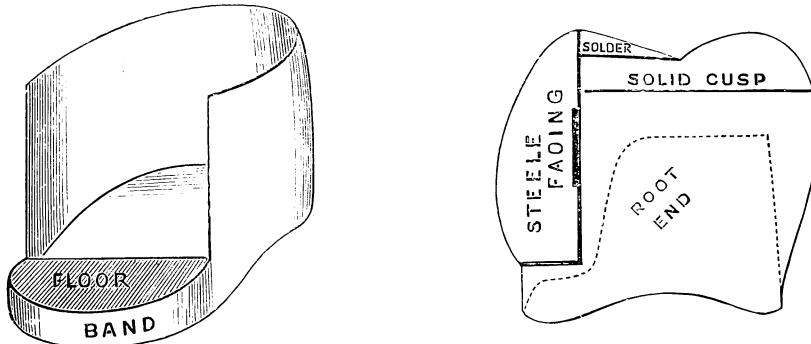


CLINICAL DEMONSTRATIONS

One Method of Using Steele Facings on Bicuspid and Molars

By H. B. ROSENWASSER, Cleveland, O.
Clinic prepared especially for "Items of Interest."

Prepare the root as for an ordinary shell crown, trimming buccal portions at a right angle to make room for Steele facing. Make a shell crown band, filing the buccal side to within an eighth inch of gingival end, a sixteenth of which should extend below the gum similar to the



Richmand band; the operator must use his judgment as to how much gold he may allow to extend above the gum line. All filing must be at right angles, and may be continued till the mesial and distal flaps are hidden from view by the adjoining teeth. Solder a piece of thin gold as a floor to the buccally-extended portion. With the floor as a base place the Steele backing against the filed mesial and distal flaps, and solder backing to band, allowing backing to extend above band till crown is completed. Swage solid gold cusp, fit it against the backing and higher portions of the band, and solder cusp to band. Place crown in mouth and

grind facing to correct articulation. Trim backing to facing. In case the occlusal surface is not high enough unite it to the backing with solder. When completed you have a very strong, durable as well as cosmetic crown, with all the advantages of a removable Steele facing.



FIG. 1.

Gilmer's Method of Treatment of Fractures of the Jaws.

By ALICE M. STEEVES, D. D. S., Boston, Mass.
Clinic before the New Jersey State Dental Society, July, 1906.

Much has been written about methods of treatment of fractures of the jaws, and after all, we not infrequently hear in dental societies animated discussions concerning the best way (?) which seems in many cases to be altogether not quite satisfactory. After much observation and some experience I feel convinced that the method advocated by, and so far as I can find, original with my professor and friend, Dr. Thomas

L. Gilmer of Chicago, has more good points to recommend its use than any method that I have seen, inasmuch as there are no impressions to be taken, no splints nor appliances to be made, and, most important of all, normal occlusion is assured if reasonable care be taken in the adjustment of the wires, so as not to make more traction than is necessary.

Inquire if the patient has had plenty of time to digest the last food taken; if not wait a few hours, thus avoiding any danger from emesis.



FIG. 2.

Examine mouth carefully both to ascertain the location and condition of the fracture, also the number and condition of the teeth; of course there must be little on either side of the fracture in the body of the bone, and in the event of a fractured ramus this will then take care of itself. Usually there are one or more teeth absent so that liquids can easily be taken through a feeding tube or cup, and at all events just so soon as muscular relaxation is secured the patient will manage very well in feeding himself from a cup.

ITEMS OF INTEREST

Report of Case.

Frederick G., aged 23, Italian, was admitted to the hospital, March 16th, with a diagnosis of a fracture of the left ramus caused by a blow from the handle of a scraper bar. On examination hours afterward, I found a fracture between the left lateral and cuspid teeth. At this time the swelling and contusion were so severe that it was impossible to diagnose a fracture of the ramus from crepitus, but from the roatating of the fragment inward it was proved that there was a fractured ramus.

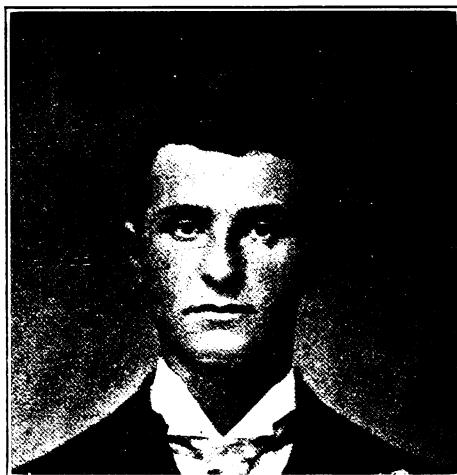


FIG. 3.

Operation. Because of the perfect teeth and that the molars crowded close against the rami nitrous oxide was administered and the upper third right molar was extracted in order that the patient might take nourishment. German silver wire is preferable for this work. Wire, gauge 28, was cut in convenient lengths and a wire was passed around the neck, and twisted firmly on each of the first molars and both bicuspids on either side of both jaws. Then standing at the head of the table, the patient's head was firmly held, and the fragments pushed into apposition and normal occlusion secured. The assistant then held the jaws in place while the wires were crossed and securely twisted together, the ends were then cut and folded under and covered with a small piece of modeling compound to avoid scratching. The patient was then put to bed, morphia sulphate gr. 1-4 given to relieve the pain, and an ice bag was applied to the contusion until the



inflammation and swelling subsided. Muscular relaxation was secured in five days. The mouth was thoroughly irrigated with an alkaline mouth wash as often as was necessary to keep it in a clean, wholesome condition. Cathartics were given to keep the digestion in order (thus avoiding a milk mouth).

The wires were tightened after the swelling subsided and again two weeks later. At the end of six weeks the wires were removed and semi-solid diet given. Owing to the fact that the fracture passed through the socket of the cuspid tooth and this tooth was still loose, a ligature was laced around the teeth sufficient to keep this in alignment, and in a short time normal occlusion was all the support necessary.

Almost any sort of a fractured jaw can be treated successfully in this way, provided there are teeth to support the fragments, and wonders can be accomplished with a few teeth used to advantage.

Fig. 1 shows method of applying wires.

Fig. 2 occlusion four months after the injury.

Fig. 3 the symmetry of the face four months afterwards.

Some Features and Mechanical Principles Observed in Natural Teeth that should be possessed by Gold Crowns.

BY DR. H. B. HARRELL, Gainesville, Texas.
Clinic before the Texas State Dental Association, 1906.

Normal products of nature are perfect in every principle, perform every function for which they were created, and can not be improved by man. Therefore whenever it is necessary to repair a thing of nature, the nearer we duplicate nature, the better the results.

The mouth is an important and a wonderfully perfect apparatus, that performs a number of important functions, one of which is that of mastication, and for this purpose it is a marvelously accurate machine, that should be studied and understood as such by every dentist. I will only call attention to a few features and mechanical principles to be seen in natural tooth crowns and their arrangements, the interdental space, approximal contact, grinding surface and size of crown. These we should as nearly duplicate as possible, being governed in each case that we are called upon to repair, by the possibilities and requirements of the case.

In making a gold crown, the root or tooth to be crowned must be prepared, so that the greatest circumference will be at or just beneath

the gum margins; a close-fitting band is adjusted to this, leaving the band as wide as the occlusion will permit, allowing the occlusal edge to be as irregular as the case requires. Contour and shape is then given to the band, which is placed on the root and spread mesially and distally to obtain the desired approximal contact of band and adjoining teeth.

**A Study
of Masticatory
Planes of Molars.**

We are now ready to construct the grinding surface. Here we will study the designs of nature, which we should follow as much as possible. We will observe that mastication is accomplished by a process of tearing and crushing, rather than grinding, and that the grinding surface of the natural teeth is perfectly de-

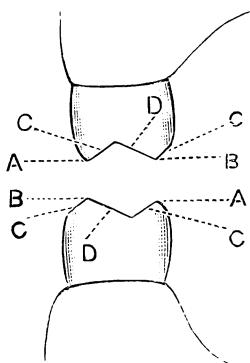


FIG. 1.

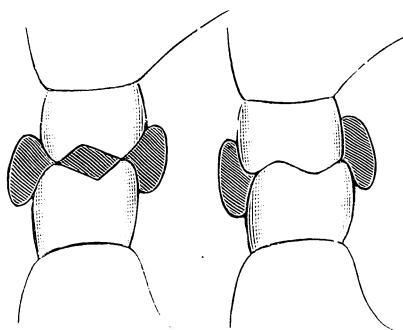


FIG. 2.

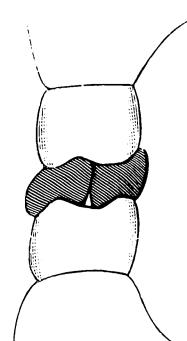


FIG. 4.

signed for this purpose. Each molar has two sliding planes, one crushing surface, one incisive angle and one crushing angle. (See Fig. 1.) The lingual angles of the lower molars present the incisive or tearing edges, while the buccal present the crushing. The reverse of this is observed in the upper teeth; also the sliding and crushing planes are reversed in lower and upper teeth.

The process of masticating is accomplished by throwing the jaw to position, so that when the teeth are forced through the food, the lingual and the buccal angles come in contact, forming three portions of food, buccal, interdental and lingual. (Fig. 2.) The jaw is then drawn inward, with the opposing sliding planes in close contact. The incisive edge of the upper teeth slides downward and outward along the buccal sliding planes of the lower teeth, carrying and tearing asunder the buccal portion from the interdental. At the same time, the lingual portion is torn from the interdental in the same way, except that on the buccal



side the cutting edge is on the upper and slides downward and outward, while on the lingual side the cutting edge is on the lower teeth and slides upward and inward. At the same time that the buccal and lingual portions are being simultaneously torn from the interdental, the two crushing edges are sliding toward each other until the crushing surfaces come together, thus holding, squeezing, and forcing out through the grooves the interdental portion. (Fig. 3.) As the jaw is opened for a repetition of this process, the cheek and tongue places the uncrushed portions again between the teeth (Fig. 4), until the work is finished.

Brittle substances are caught between the crushing planes, and the sliding planes in contact prevent its escape until crushed. The surfaces of these planes are not smooth, but uneven, and the angles are rounded so that they are not conspicuous, but a profile view will show them in every normal case. They usually vary in different cases and are sometimes obliterated by abrasion. It is to these differences that we should conform the grinding surface of our crowns.

Construction of Properly Formed Crowns.

We will now refer back to where we have the band formed and fitted ready for the grinding surface. Warm a bit of impression compound, place it in the band and have the patient grind the teeth, re-

move the band and compound together, wipe out and dry inside of band and compound, fill the band with melted hard wax and when cool trim off the surplus compound, exposing the edge of band about one-half its thickness, carve and groove the grinding surface. This surface is formed by the bite of the opposing teeth so there can be no interfering cusps or planes; the grooves add to the appearance, form avenues of escape and increase the grinding and crushing possibilities. Now mix a little plaster and place it on a paper tablet; fill the grooves and depressions with the plaster to prevent air bubbles. Set the grinding surface of the crown in plaster allowing the plaster to extend just a little way up the band. When plaster is set remove the crown and trim plaster almost to the shoulder made by band in the impression. This leaves a flat surface around the impression. Set the small end of a common open-ended sewing-thimble, or a ring of mouldine around the impression and pour it full of fusible metal just as it begins to thicken. Drive this die into a piece of lead for a counter; cut a disk of thin plate (I use 24K about as thin as I can roll it), and swage it between these dies; trim the edges of disk almost to the shoulder, place this cap or disk on crown over compound and burnish the edges down close around band, remove cap, warm band and push out compound and wax; burn wax from band and replace cap. It will only go on in the right way and the shoulder stops at the right place. You can attach cap to band



with a bit of 20K solder and afterwards put in reinforcement, or the attaching of cap and reinforcing can be done at the same time.

**Method of
Reinforcing
Cusps.**

Now, a word as to the reinforcement. We want a uniform thickness of the grinding surface and do not want the solder to climb the walls. To obtain the one and prevent the other, cut a disk of thin plate and perforate it full of holes with a small punch (this is to prevent air bubbles between the disks), swage this disk between the dies; trim the edges just enough to let this disk drop into the crown; the disk will lay close in the bottom; drop in bits of fluxed solder; flow and all will go right. The disk will act as a uniform carrier and at the same time prevent solder from climbing walls. File off overlapping edge of cap and polish and the crown is ready to set in the usual way.

To put these principles into a bridge requires an articulator that will give or permit the natural grind of each case.





SOCIETY PAPERS

Alveolar Abscesses from the Anatomical and Surgical View-point.

BY M. H. CRYER, M.D., D.D.S., PHILADELPHIA, PA.

Read before the Second District Dental Society, March, 1906.

No pathological conditions of any portion of the body can be successfully treated without an understanding of the anatomical structures and the pathological action of the region treated; therefore, the anatomy of the upper and lower jaws and especially that of the alveolar processes with their relations to the teeth and the maxilla and mandible will first be considered in brief outline so that we may gain a clearer idea of the manner in which infection of the upper jaw may be transmitted from one point to another within its processes or to more remote regions such as the nasal chamber, maxillary sinus, and other pneumatic spaces of the face; and in the lower jaw to the region of the chin or along the border of the body of the mandible or into the deep regions of the neck. Infection of these regions can also produce serious results in the more remote parts through sympathetic and reflex action, especially to regions that are supplied by the same system of nerves, blood vessels, and lymphatics.

**Anatomy of
Jaw-bones.**

Beginning with the anatomical phase of this subject, Fig. 1 shows a specimen from which the outer wall of the alveolar process, a portion of the true bone, and part of the cancellated tissue have been removed, thus exposing the remaining cancellated structure, which shows the loose lattice-work arrangement of the internal structures of the alveolar process. In the upper jaw of this specimen the outer surfaces of the lateral and anterior walls of the maxillary sinus are shown. The

relation of the roots to each other is also indicated and it shows that those of the upper teeth, except the palatal roots, are nearer the surface than those of the lower teeth. Abscesses that have originated by infection through the roots of the upper teeth usually point and open into the

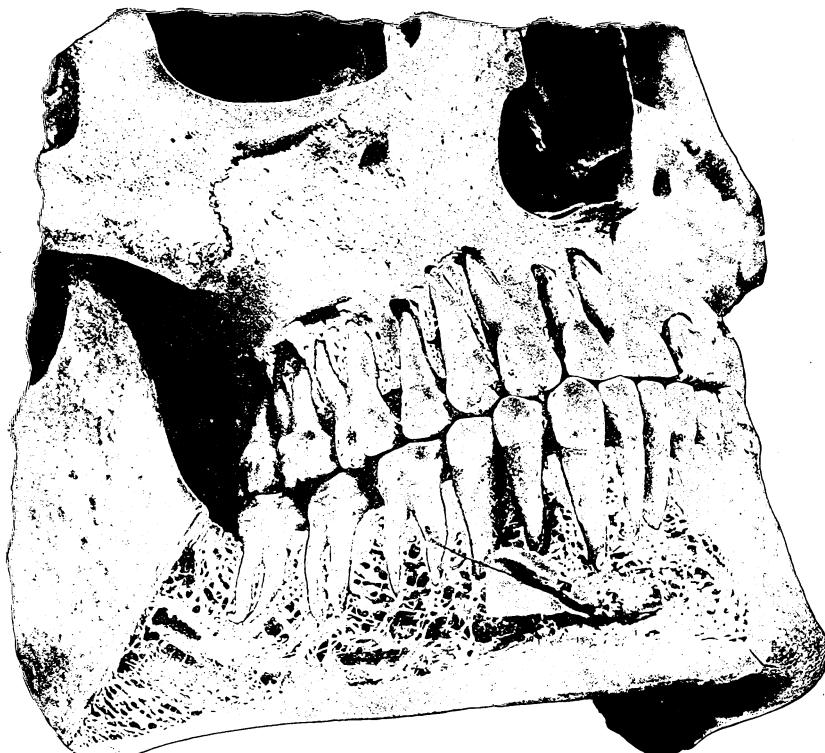


FIG. 1.

vestibule of the mouth. The upper incisor roots point in the direction of the floor of the nasal chamber and the apices of these roots are fairly close to the floor, but abscesses seldom open into the chamber; occasionally, however, they extend backward between the upper and lower plate of the bone forming the floor of the nose and the roof of the mouth, at times causing considerable necrosis of this region which is sometimes mistaken for syphilitic necrosis. If the tooth associated with such abscesses does not readily respond to treatment, it is advisable to extract it

as a large portion of the roof of the mouth may become involved. Occasionally a fistula from the lateral incisor will extend backward and open into the maxillary sinus.

The roots of the canine teeth and those of the first premolars usually point in the direction of the frontal process. The canine and buccal roots of the premolar have but a superficial bony covering and naturally the outlet of abscesses is in the vestibule. The palatal root of the premolar occasionally opens in the root of the mouth or it may burrow between the

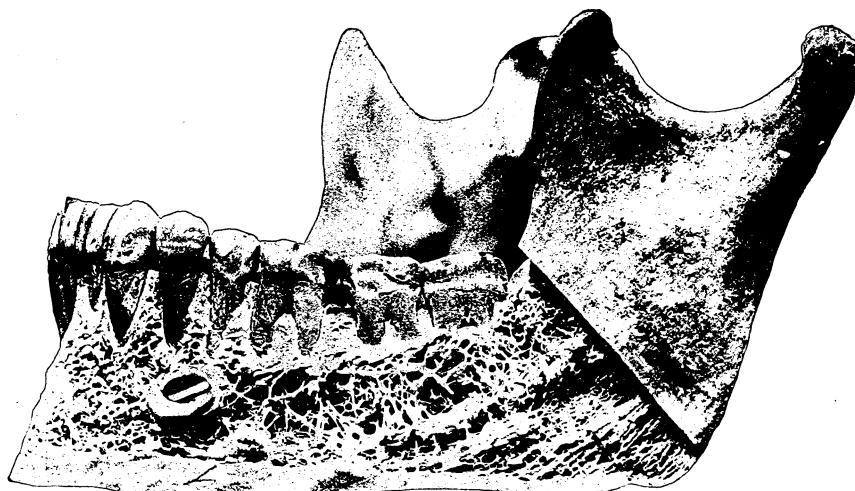


FIG. 2.

plates of the bone and enter the maxillary sinus. Abscesses from the second premolar usually open into the vestibule, occasionally into the antrum.

As the roots of the molar teeth of the Caucasian race are all closely associated with the antrum it naturally results that infection of the sinus is more likely to follow from the molar teeth than from others, and one who has had but little experience would think that an abscess would be more likely to break into the sinus than into the vestibule or roof of the mouth. Experience, however, teaches us that these abscesses seldom break into the sinus. One of the chief reasons for this is that when the investing tissues of the teeth become infected, the osteogenetic layer of the mucoperiosteum lining the sinus is stimulated to renewed activity, with the result that a new layer of bone is produced which covers these points and

protects this cavity so that abscesses, with but few exceptions, point and break into the mouth.

There are exceptional cases where abscesses arising from molar teeth have their outlet direct into the nasal chamber, as shown in Fig. 12. Abscesses arising from the upper third molars have also been known to open into the zygomatic fossa.

In the lower jaw the roots usually point in a general direction toward the inferior dental canal or tube which contains the inferior dental nerves and vessels and their associated tissue.

Fig. 2 is made from the left side of the mandible. It gives a good idea of the cancellated tissue of the lower jaw, as but little of it has been removed. It also shows that the roots are well covered with cancellated tissue.

**Danger of
Using Peroxid of
Hydrogen.**

Abscesses of the lower teeth are usually more difficult to treat than those of the upper jaw. The principal cause of this is that the roots are not so near the surface and that gravitation operates against easy drainage.

Hydrogen peroxid is very commonly used and recommended by dental teachers and is prescribed in the late editions of *Burchard's Dental Pathology* and in the *American System of Operative Dentistry*, but the writer feels that its use is a mistake. Having shown Fig. 2 at a meeting of the Section of Laryngology and Otology of the American Medical Association, in 1897, I was asked if I would use hydrogen peroxid in the treatment of infection of this cancellated tissue. My answer was that by passing this medicament into closed or partly closed cavities it could cause great damage by the liberation of oxygen, which as liberated gas, instead of destroying the micro-organisms becomes a vehicle to carry or force the microbe into new fields. This has been so well recognized by the otologist and the general surgeon that hydrogen peroxid is seldom used by either. Many illustrations could be given where great damage to the upper and lower jaws has been caused by the injudicious use of hydrogen peroxid; the following is a case, others will be mentioned.

A lady about forty-five years old under the care of one of the best dental practitioners in Philadelphia had a second lower premolar which had become diseased at the root. The filling was removed, the pulp chamber and canal thoroughly cleaned, and a treatment, which is usually successful, carried on. Hydrogen peroxid was used without success; the abscess finally opened into the vestibule of the mouth near the position of the mental foramen. Through this fistula hydrogen peroxid was injected, the parts grew worse and the tooth was removed and again the same medicament used. Several months later the parts were carefully

examined and the opening to the abscess slightly enlarged so that a silver probe could be passed into the bone; but little effort was required to pass the point of the probe backward close to the region of the inferior dental foramen and forward to the region of the symphysis menti. Here was a case where a great portion of cancellated tissue in the body of the bone had been destroyed by direct action of hydrogen peroxid and by the infectious matter being carried or forced by the liberated oxygen into uninjected parts.



FIG. 3.

The simple treatment for this case consisted in discontinuing the use of hydrogen peroxid and substituting an injection of saline solution. Granulation set in at once and the abnormal canal filled up in about two months.

Fig. 3 is made from the skull of a child about six years of age. It shows all the deciduous teeth in position, and all the developing permanent teeth which are to take the place of the temporary ones. It also shows developing permanent teeth which have no predecessors. Taking the teeth collectively it will be observed that nearly all the space of the maxillary bones is occupied with teeth. It will be readily understood that great damage could be done by abscesses arising through infection from the deciduous teeth, as the infectious matter would pass

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between the germs of the permanent teeth and thus interfere with their development or destroy the surrounding tissue. It may be admissible here to point out the extreme importance of avoiding alveolar abscesses or infectious conditions at this period, as beyond the fact of their interfering with the developing permanent teeth, other serious results often

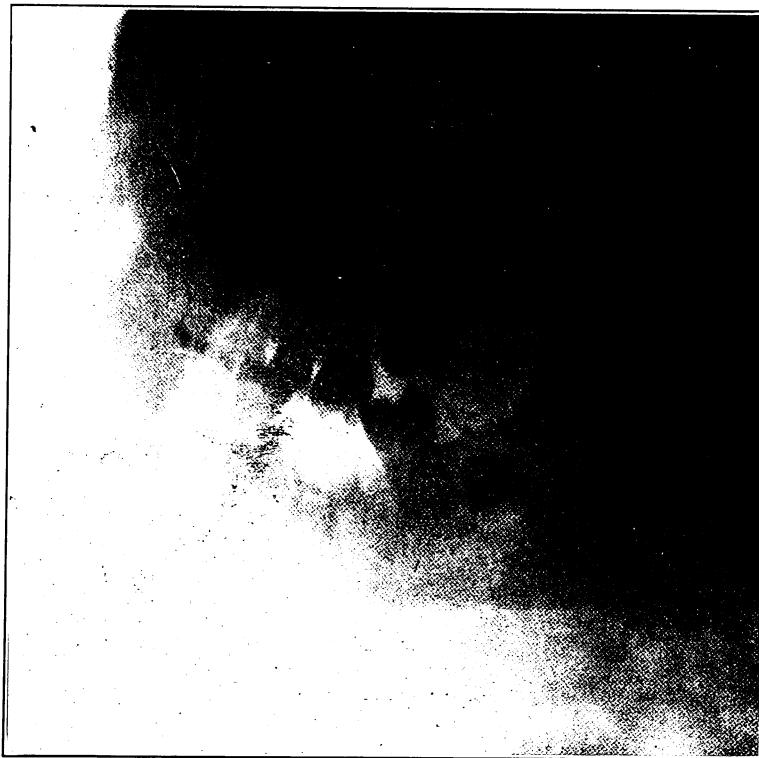


FIG. 4.

follow, the general character of the face is undergoing development, the orbits, the nasal chamber, maxillary sinus, and other pneumatic spaces, may be greatly modified by any resultant pathological condition, thus interfering with the organs of mastication, speech, breathing, olfaction, sight, and even hearing, and may also serve as the unsuspected origin of reflex disturbances in remote organs. In order to avoid abscesses the deciduous teeth should receive unremitting care so that decay may not progress far enough for the pulp to become exposed or lost before the

physiological time for the tooth to be "shed." The premature loss of even a single one of these teeth may cause a disarrangement of all permanent ones and modify the internal anatomy of the face. Infectious conditions in or about the teeth may prevent a normal development of the alveolar process or jaws proper. For these reasons, the deciduous teeth should have much greater attention than they usually receive.

After writing the above paragraph a patient nine years old was referred to the oral surgical clinic at the University of Pennsylvania. She



FIG. 5.

had an external discharging fistula on the under border of the body of the mandible about opposite the second premolar and on examining the mouth it was found that the left second deciduous molar was missing, but on passing an excavator cautiously into the space where the missing tooth should have been it came in contact with either dead bone or a piece of tooth. Not wishing to use force on account of the suspected germ of the second premolar, the parts were carefully washed out and an X-ray picture made which is shown in Fig. 4. A portion of the deciduous tooth and the permanent one below it can be seen; it also shows a more important condition, the first molar and the first deciduous premolar are in position with the germ of the permanent tooth below the latter; the second premolar is also shown; it should be about on a line with the first premolar, as illustrated in Fig. 3, but is far below the line. This has been caused by the destruction of the bone tissue immediately below the tooth

which has allowed it to settle into a false position. The abscess can be cured but if the molar and first premolar are not kept apart they will close towards each other and cause the impaction of the second premolar. This is a marked case where the neglect of the deciduous tooth has caused an abscess to open on the outer surface causing malposition of the teeth and more than likely other deformities.

Another case, somewhat similar to the above, is that of a child

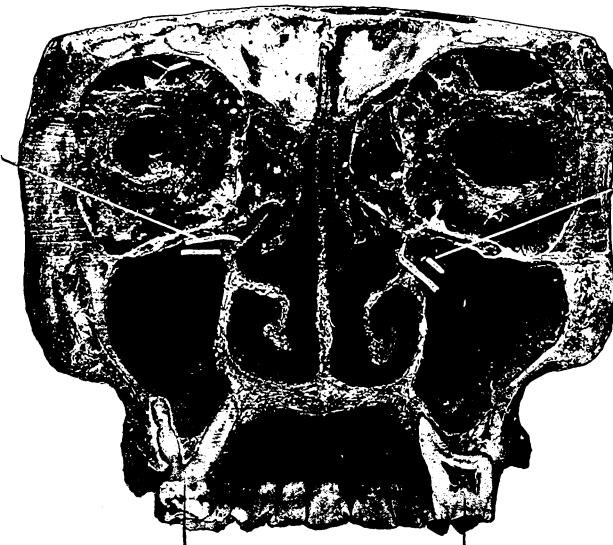


FIG. 6.

twelve years of age who had an infection associated with the upper right second deciduous premolar. The micro-organisms passed upward into the floor of the maxillary sinus causing the sinus and the nose to become infected. The germ of the second premolar became partly dislodged the occluding surface passing forward and resting on the posterior surface of the root of the first premolar which is inclined posteriorly, as is partly shown in Fig. 5 which was taken from a plaster cast. The patient is in the hands of a very competent and enthusiastic orthodontist who will endeavor to bring the misplaced tooth into its normal position. If the patient were under my charge I would have had the misplaced tooth removed so that the antrum could be properly treated, which I fear will be impossible while the tooth remains.

Sections of
Jaw-bones.

Fig. 6 is taken from a posterior view of a bilateral perpendicular section of the face in the region of the first molar teeth. It shows the relation of the roots of the molar teeth to the maxillary sinus.

In this case as is usual with nearly all Caucasian skulls the upper portion of the roots of the molar teeth are in the walls of the maxillary sinus. It will be seen that the apices of the roots of these teeth are in close juxtaposition to the sinus. The illustration also shows the outlet (ostium maxillare). It is usually through this opening that infection passes to regions beyond the antrum. It is also well to draw attention to the relation of the points of the roots to the maxillary sinus, as shown in this

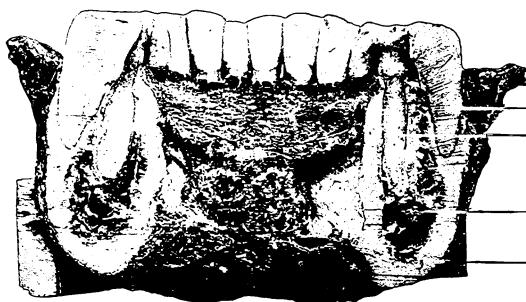


FIG. 7.

illustration and in the roots of the upper molars and second premolar of Fig. 1, as some practitioners advocate the removal of the ends of the roots, in cases of chronic abscesses, which would be liable to make an opening into the sinus.

Dr. Kirk has called attention to those cases of threatened abscesses of the upper posterior teeth which cause great pain and which suddenly subside during treatment, from which fact the practitioner may decide that a cure has been effected when in reality the relief is due to the discharge of pus into the sinus. These teeth may continue along this line indefinitely without giving much trouble, but, on the other hand, they often produce infection of the entire maxillary sinus with a probability of infecting the other pneumatic sinuses and cells or even passing into the brain case.

Fig. 7 is a similar section to Fig. 6, but of a lower jaw. It gives a good illustration of the U-shaped cortical bone that forms the outer and inner wall of the body and of the alveolar process of the mandible. The space between the walls of the bone is filled with cancellated tissue, the

alveolus, and the roots of the teeth. Passing through this tissue horizontally from the inferior dental foramen to near the incisor teeth is a tube or canal to accommodate the nerves and vessels; the outer wall of this tube and the cancellated tissue were shown in Figs. 1 and 2. It also shows in the upper portion of the cancellated tissue part of the anterior roots of the lower first molars. To the inner side of these roots will be observed the roots of the second premolars and immediately below the apex of the roots the inferior dental tubes are plainly seen. If these



FIG. 8.

teeth should become diseased and the infection should pass out of the apical foramen, it can be readily seen that great pain and destruction would arise from such a condition, as the roots are on the inner side of the space occupied by the cancellated tissue. It is also evident that hydrogen peroxid would cause much mischief if injected or passed into this space as was illustrated in the case already referred to.

Fig. 8 is made from various sections of a mandible which was not quite normal, there being evidence of past inflammation which had changed the structure of the bone. In one section the apex of a root is partly in the inferior dental tube. Infection from a tooth in this position

could pass along the tube to almost any distance, causing great pain by pressing upon the nerve. I have no doubt that there are cases of this character where infection has passed backward, upward, and out through the inferior dental foramen, thus infecting the region of the zygomatic fossa.

Fig. 9 represents a specimen in which the roots of the third molar pass out through the inner wall of the lower jaw at a considerable distance below the mylo-hyoid ridge. A putrescent pulp in this tooth would have discharged its infectious matter at once into the submaxillary fossa or triangle. I believe there are many serious unrecognized cases

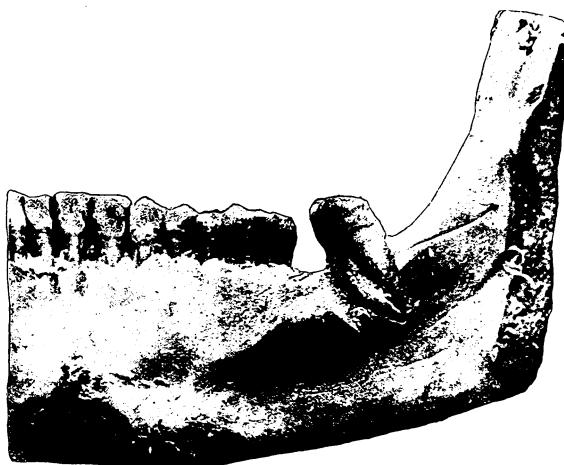


FIG. 9.

where devitalized teeth of this character cause infection of the tissues of the neck and even of the thoracic cavity. Therefore, if diseased teeth of this region do not respond to treatment at once, they should be extracted, as not only ill health but death itself may, and does, occur from their presence. I have seen large triangular swellings just under the jaw which indicate that trouble existed within the submaxillary triangle, a symptom of a diseased submaxillary gland. Upon examination of the teeth a diseased molar was found, and after this tooth was removed the swelling subsided.

Fig. 10 is an antero-posterior section of the upper jaw with the first molar decayed and the pulp chamber of the tooth opened. The root canal has been infected and the infection carried into the sinus. In this case there is evidence of a constructive periostitis, as already spoken of.

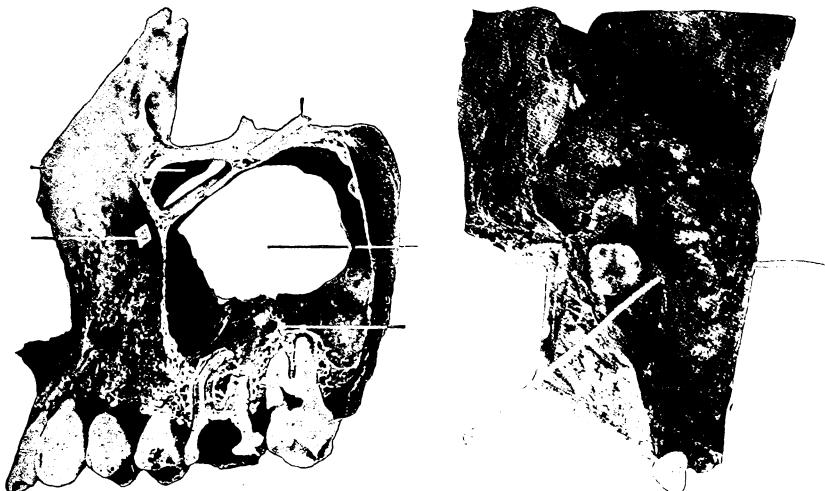


FIG. 10.

FIG. 12.

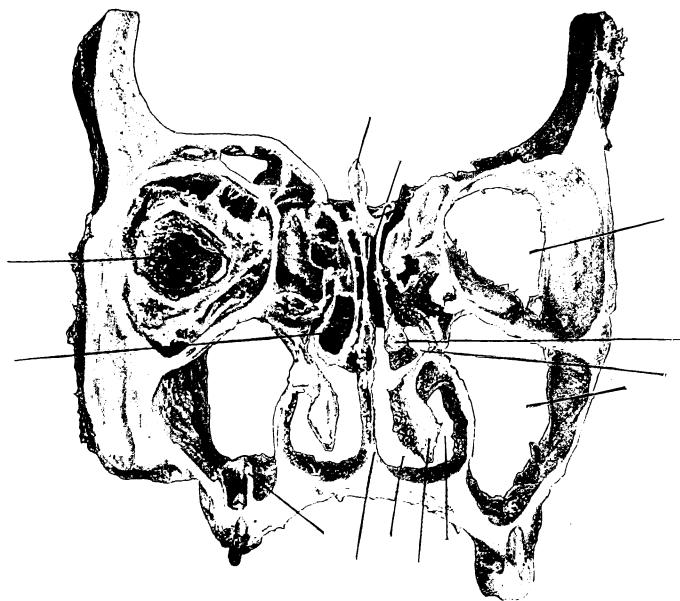


FIG. 11.

upon the floor of the antrum which has caused a thickening over the apex of the root. At a later period the bone has broken down and the sinus has become infected.

Fig. 11 is a vertical transverse section of the maxillary sinuses and nasal chamber. In the floor of the right antrum the conical portion of the bone, covering the infected tooth, has been cut through the center exposing the end of the root in the infected region, the condition being somewhat similar to that shown in Fig. 10. Abscesses of this character, if neglected, can produce the most serious disturbances extending to pneumatic sinuses and cells and even into the brain case, as already referred to. The infectious matter produced in the pneumatic sinus and cells flows backward and downward to the stomach and infection is even transmitted to the lungs. From a hygienic and surgical standpoint such teeth should be extracted and a larger opening made through the socket into the antrum which would establish good drainage and a free access for thorough cleansing of the sinus. When the sinus alone is infected care should be taken not to force pus or foreign matter into other internal regions of the face. If other portions have already become infected after the contents of the antrum have been washed out, it is then advisable to force medicaments into these regions. Diseased teeth may produce the same condition in the sinus and when extracted the gums and process will heal, but later trouble often manifests itself through the nasal chamber. Therefore, an investigation should be made at the time of extracting such teeth to see whether the sinus is infected, as it can then be treated and cured.

Fig. 12 is made from an upper jaw. It shows where an abscess, which was associated with the first molar, has penetrated the nasal cavity. Abscesses of this character take place where the maxillary sinus is small. Its floor does not cover the roots of any of the teeth, the nasal fossa being wide and extending outward over the roots and under the sinus. In subjects of this character abscesses of any of the upper teeth are liable to open into the nasal fossa.

There are certain classes of necrotic conditions
Necrosis. of the jaws associated with the teeth that do not arise

through an infection of the pulp. One class may be associated with teeth that are in fairly good alignment or occlusion, another one with those that have had teeth in poor alignment or occlusion and have had injudicious corrections made, and still another with those associated with teeth that have been retarded in their eruption.

The first of this class is well illustrated in Fig. 13, which is from a dried skull and shows an opening extending from the vestibule to the roof of the mouth in the region of the left central and lateral incisors.

The ends of the roots are exposed in the necrotic area. There is also a necrotic area between the left premolars. There is no evidence of decay in any of the teeth, therefore it can safely be said that the primary infection did not pass through the pulp canals. There is also no evidence of mechanical influence, which leaves two other sources of infection, that which passes between the teeth and the surrounding tissue and that which is carried through the blood current; pyorrhea alveolaris and pericemental abscesses would come under these modes of infection.



FIG. 13.

**History of a
Case of Necrosis.**

The following case is somewhat similar to that illustrated in Fig. 13, especially as there was no decay of the teeth. A woman, twenty-four years of age, came under my care in June, 1906; examination proved the upper right canine to be pulpless with a temporary filling in the canal and pulp chamber. The pulp of this tooth had become devitalized without caries of the tooth. There was the opening of a fistula below the apex of the canine tooth and towards the lateral incisor. A silver probe could be passed upward and backward under the apex of the root for a distance of two and a half inches, striking uncovered bone. When the temporary filling was removed a fine probe could be passed along the canal and out of the end of the root. The root was cleaned and a cotton dressing saturated with campho-phenique was placed in the canal, which was then covered with a gutta-percha filling. The external

tistulous opening was made larger and the parts curetted and packed with a cotton dressing slightly saturated with campho-phenique; this was continued for several days, but did not yield to treatment. The incisors being suspected they were closely examined; the lateral was found to be vital, the central devitalized. Upon opening the pulp chamber through the lingual surface of the tooth pus flowed out. The cavity and canal were cleaned and left open. The necrotic lesion near the canine tooth at once began to improve and closed in about ten days and is in good condition at this time. The central incisor did not respond well to treatment; the left central was suspected and opened; the pulp chamber contained pus. If one of these teeth were left open the patient had comfort, but if both were closed there was pain and a swelling over the roots, establishing the fact that the necrotic area of these two teeth and the canine communicated. This caused a more minute investigation of the history of the case, when it was found that in her early life the patient had had adenoid growths removed from the naso-pharynx; her teeth had been irregular and she had been placed in the hands of an orthodontist for the correction of the irregularities. It was ascertained that hydrogen peroxid had been used to a considerable extent in the treatment of the necrotic condition near the canine tooth. Theory: First, that this patient was not of robust character, as is often the case with those having enlarged tonsils, adenoid growths, and irregular teeth, etc., and through some constitutional disturbance there was a deposit of infectious matter in the region of the necrosis. Second, her system lacked the recuperative power to repair the local disturbance produced by the mechanical appliances of the orthodontist, thus destroying the nutritive process of this region and the vitality of the three teeth. Third, the injection of hydrogen peroxid into the necrotic region of the canine tooth assisted in breaking down the surrounding tissue and the liberated oxygen acted as a vehicle to carry or force the pathogenic bacteria into healthy tissue, thus causing the devitalization of the two incisors and the death of the surrounding tissue.

**Necrosis due
to Retarded
Eruption.**

Another class of necrotic conditions associated with vital teeth are those of retarded eruption. The term impacted is generally accepted to mean teeth that are prevented by other teeth from erupting; they may, however, also be held in bone tissue which has become solidified, thus preventing them from taking their normal positions. These teeth often are a source of constant irritation to both the bone and the surrounding tissue. The bone becomes dense and loses its porous and elastic character, thus eventually preventing the proper supply of blood to the tissue, which finally lessens the vital resistance to

ITEMS OF INTEREST

infection. There are many cases of necrotic conditions existing between the roots of impacted teeth and the bone. At times a very active infection takes place, the surrounding tissue becomes involved, and the infection may extend some distance from the first point of attack. This inflammatory condition in the lower jaw may extend to the temporo-mandibular



FIG. 14.

articulation, the tonsilar space, and even to the post-pharyngeal wall. Impacted teeth, as a rule, should be removed as soon as it is found that they can not be liberated or got into a useful position. Impacted lower third molars, if left until abscesses have formed in connection with them, are sometimes difficult to remove on account of an acute form of false ankylosis or trismus which may take place. The following two cases illustrate the necrotic condition associated with impacted teeth. Fig. 14 gives an X-ray picture of several impacted teeth. The lower left third

molar was originally held back by the second molar, which was extracted five years ago in order to cure a then necrotic and painful condition of the surrounding tissue, with the hope that the third molar would move forward and assume a useful position. The original X-ray plates show a marked solidification of the bony tissue and lower portion of the



FIG. 15.

root. There was a constant flow of pus from the posterior surface of this tooth and evidence of marked systemic disturbance. There was severe pain within the jaw which at times even extended to the upper one. The tooth was removed together with a portion of the surrounding bone by the use of the surgical engine. I am of the opinion that if this tooth had not been removed a general necrotic condition of the angle of the jaw would have taken place.

Incidental attention might be drawn to the impacted condition of the



lower right third molar; also to the upper left first, second, and third molars which are held in the jaw in abnormal positions. The occluding surface of the upper third molar is directed forward, a rather unusual condition for an impacted upper third molar.

Fig. 15 is from an X-ray picture of the jaws of a patient sixty-six years of age who was suffering from a discharging fistula of the lower right jaw situated over the region of the second molar tooth. A probe could be passed down through the gum and into the bone coming in contact with a tooth. The patient had also been suffering with neuralgia of the face and right ear and was troubled with deafness. The picture shows that a molar tooth is lying horizontally in the body of the bone with the face of the crown forward. The darkened area about the roots and around the outside of them implies that they are surrounded by hard dense bone, while around the crown of the tooth there is a light area which indicates a necrotic condition or the porosity of the bone. There could be but one treatment suggested in this case, i. e., the removal of the tooth. On account of the age of the patient, and the hardness and lack of vascularity in the bone together with the position of the necrotic area, the parts were slow to heal.

Treatment of Alveolar Abscesses. On general principles abscesses arising within the alveolar process, either by infection from a tooth root or through other sources, should be treated in the same general manner as abscesses in other regions of the body, i. e., remove the source of primary irritation and infection, secure ample drainage, and stimulate, by proper medication, to induce the growth of healthy granulation. If this be done in an otherwise healthy person the abscess will become cured. This is easily said and performed from a purely surgical standpoint provided the abscess has made its outlet within the oral cavity, but from a dento-surgical point of view it presents more difficulties on account of the great desire to save teeth.

The special dental treatment, particularly in cases of otherwise useful teeth, consists in the removal, by mechanical means, of the decomposed contents of the root-canal or canals and in cleaning them as thoroughly as may be practicable. Suitable dressings are then introduced in the canals, and the operation repeated until all symptoms of putrefactive processes have disappeared. This being secured the root-canals are sealed permanently with any of the filling materials available for the purpose. For very simple ordinary acute cases success can be obtained, but to treat many of the extraordinary chronic cases there is a different story to tell, and if this paper will bring out valuable methods in discussion it will have gained one of its objects.

I have already stated that I would not use hydrogen peroxid. As this is so strongly recommended by our teachers and leading text-books, a discussion upon this point should be aroused. Another method which has been practiced for a long period is the making of a rather large extended opening down to the apex of the root. If the end of the root is denuded or roughened it is removed by a fissure or surgical bur. If this is nicely done and the extent of the necrosis of the alveolar process is not too great, or if the other teeth are not involved, and the patient is of a healthy constitution, it is a justifiable operation, but as in other cases there are many failures connected with it. From the illustration shown there are many teeth, the position of which would scarcely permit the operation to be performed.

The extraction and replantation of teeth has been resorted to with varying success. The success of such an operation depends greatly upon the shape of the roots, their position, the extent of necrotic area, and the recuperative power of the patient. Of course this operation must be done under the most careful antiseptic conditions.

From a purely surgical standpoint I would advocate the extraction of nearly all teeth that have chronic abscesses associated with them which can not be cured, especially if the infection is liable to be transmitted to the deeper structures. There are exceptions however. Discharging abscesses associated with teeth have existed for years without apparent disturbance to the general system. Some advocate the retention of such teeth provided they can be used in mastication. My friend and preceptor, Prof. Thomas C. Stellwagen, has made a public statement that he has had abscesses connected with his teeth for over forty years and does not feel that they have injured him in any way and I agree with him that they have not, from all appearances. A man who can go out naked into a snow drift and roll over in it with the mercury at 16° F., and not be injured in so doing, should be able to stand a dozen or more such abscesses. If we should take Professor Stellwagen as an example and contrast his high resistive power with one in whom the resistive power is almost lacking, it will be plainly seen how the many disease factors which tend to reduce or destroy this same resistive power of the healthy individual enter into the problem of treatment of the cases under present consideration. While the healthy individual is practically immune to extensive invasion of the class of bacteria concerned in the causation of these dento-alveolar suppurations, yet on the other hand every possible artificial aid must be brought to bear to prevent infection of any kind occurring in patients whose vital tone is below normal. It is for this reason that no fixed rule can be established for the treatment of all patients for no two have the same recuperative powers, and in the same person at different times and under different circumstances, the resistive and restorative power changes. Therefore, the treatment of the same disease in the same person, even, can not be alike successful at all times. As with ordinary disease so every abscess is a law unto itself and must be treated accordingly.



The Manipulation of Amalgam.

BY CHARLES SHEPARD TULLER, D.D.S., NEW ORLEANS, LA.

*Read before the Louisiana Chapter of the Interstate Dental Fraternity, on Friday,
July 20, 1906.*

The consideration of this time-worn subject we feel to be warranted both by what we observe in pursuance of our every-day practice and by reading the various papers appearing in the journals, together with their discussions. It is not, however, intended to offer anything new, but to lay stress on some of the foundation principles which, if observed universally, would give our patients a valuable and highly permanent filling, and in turn remove the cause of the many disparaging remarks too often made regarding amalgam and its use.

Perhaps the first thing to consider is the alloy.

Alloys Classified. Alloys may be divided into two general classes, viz.:

the hard or quick-setting, and the soft or plastic alloys which are very slow-setting. With a few words we will pass the plastic alloys, for since the days of Dr. G. V. Black's experiments in 1895 and 1896, the progressive dentist has learned that their value is nil as compared with the hard alloys.

Plastic alloys are mainly composed of silver and tin, with sometimes the admixture of copper or zinc and other metals. The percentage of silver is always too small. The amalgam first shrinks, then expands; thus hopelessly displacing the margins. It retains large excesses of mercury, and crystallization is not complete for months or years. The flow under pressure is great. Successful contours can scarcely be built; and packing is out of the question, since pressure on one part causes a movement in another. We thus read the death warrant of the plastic alloy.

The hard, quick-setting alloys are mostly quaternary and are composed of silver, tin, copper and zinc, in fairly definite proportions, but are *not* made from a definite, set formula. Silver, copper and zinc have in common the properties in the amalgam of hastening setting, increasing edge strength, diminishing shrinkage and lessening the flow. Tin produces shrinkage, reduces edge strength, increases the flow and retards setting, and is used only as a flux to make the amalgam sufficiently plastic to be workable.

All hard alloys should contain not less than sixty-five per cent of silver. Hard alloys are made rapid, medium or slow-setting, entirely by annealing in hot or boiling water, without any change whatever in the formula; but the same result may be attained by aging in a warm atmos-

sphere, which, of course, takes much longer. *The well-annealed or well-aged and thus slow-setting hard alloys, are the best to use, since they require less mercury and the expansion is much less.* All hard alloys expand to some extent, but should not exceed an expansion of one point or .001 of an inch.

**Cavity
Preparation.**

We will now turn to the preparation of the cavity for the reception of the amalgam, which should in all cases be preceded by ample separation when an approximal surface is involved. In all cases, the cavity should be prepared with the same care that would be given were gold to be used as the filling, and even more retention obtained, to overcome as much as possible the expansion of the amalgam. First of all, break down all overhanging enamel and extend the margins in all directions to areas of comparative immunity, following Dr. Black's principles of extension for prevention, all fissures being cut to their full length. But where the cavity is an approximo-occlusal one, the fissure which joins the approximal cavity, or that which now becomes the occlusal step or dove-tail must be cut either wider or deeper than is necessary where gold is used, as neither the tensile nor crushing strength of amalgam can compare with gold, and a fracture at this juncture is to be feared.

Areas of immunity vary greatly in different people and on different teeth. For instance, the extension on the approximal surface of a very round, bell-shaped bicuspide would not need to be nearly so great as on one that was very flat with broad approximal contact belonging to the thick-necked type, except in cases of extensive undermining. We must, however, all be governed in this matter by the conditions which confront us and use our judgment accordingly. The next step is to remove all decayed and discolored dentine and give the cavity a broad flat base in all parts. At the cervical base, it is probably better to slope the base slightly towards the axial wall, keeping it a plane surface however, thus giving it proper resistance form. The walls should be slightly undercut except approximo-occlusally and the interior angles of the cavity sharp. That sharp angles are a valuable aid in retaining any filling, has been amply demonstrated with inlays, where it is found that the more angular the cavity the better the inlay is retained. Undercuts that are too deep, weaken the tooth to an extent not compensated for in the additional retention. Dovetailing, where possible, is much better. No further argument is needed to prove the value of a flat base or plane surface upon which to build any kind of a filling or to aid in its retention afterwards, as it effectually prevents rocking at any time. The interior of this type of cavity may best be cut with inverted cone burs.

Molars and Bicuspid.

It is conceded by all the enlightened members of the profession, that where an approximal cavity occurs in a bicuspid or molar, having an approximating tooth, it is necessary to make an occlusal opening into the cavity, in order to properly prepare and fill it. We now have a compound cavity which must be made to offer sufficient resistance to prevent the tipping of the filling into the inter-proximal space and the *only* way in which this can be done scientifically and therefore successfully is to make an occlusal step or dovetail and in so doing, cut out the occlusal fissure right to its end, not forgetting as before stated that it must be cut either broad or deep for amalgam. The necessity for an occlusal step is beyond all argument as it is the *only* form of cavity preparation offering at the same time the maximum degree of resistance, an ample sufficiency of retention and the maximum amount of remaining *strong* tooth structure. The ancient method of leaving the occlusal opening V-shaped and relying on lateral retention is nothing short of mal-practice in the light of our present knowledge. In the first place, lateral retention seldom gives sufficient resistance form to the cavity and the tooth is weakened in proportion to the depth of the groove. It necessitates the undermining of the approximo-occlusal angle on each side of the cavity, which, of all parts of the tooth, should be the strongest and is the equivalent of leaving over-hanging enamel. It also invites a recurrence of decay where the occlusal fissure meets the filling, since it is impossible to finish this point flush. With a step cavity we are enabled to build a functional marginal ridge, while in the other type, using lateral retention, it is hazardous to do so. The necessity for a step cavity is in some instances done away with, where there happens to be no approximating tooth and access is easy and a sufficiency of tooth structure (not less than 3-32 of an inch in thickness, according to Dr. Jules J. Sarrazin) remains to give ample strength to the occlusal surface.

In finishing all cavities for the reception of amalgam, it is merely necessary to true the margins, as beveling, especially on the occlusal surface, is contra-indicated, since the edge strength of the amalgam is deficient. Therefore follow the rule as laid down for porcelain and never leave a feather edge.

Manipulation. All authorities agree, and the experience of any operator is sufficient to prove, that a successful contour filling of amalgam is a practical impossibility, where there are not four walls to pack into, lacking which, a matrix of some form is an absolute necessity. Amalgam so soft as to be simply smeared into a tooth is unfit for any mouth; and as hard amalgams can not be smeared, they must be packed, and packed hard. Indeed, as

Dr. Black and many others since have said, probably the most important step in the manipulation of amalgam is, to pack it into the cavity with all the force that conditions will allow. All amalgams are, to an extent, porous, as any one can see by the aid of a powerful glass, and Dr. Black says that experiment has proved that from 12 to 16 per cent of the bulk of most of our amalgam fillings is air and our only hope of expelling the greatest possible quantity of this air is to put the amalgam under great pressure; hence pack it hard. Imagine the sponge-like porosity of an amalgam that is smeared in and you will not be surprised at the recurrence of decay; hence pack it and pack it hard. No other form of manipulation will give the amalgam a perfect adaptation to the walls and margins.

The mere plugging of a cavity of decay is no longer the only aim of the dentist. The contour and natural shape of the tooth, as it stood before the attack of decay, must be restored and the correct interproximal space maintained; and while this may conceivably be done with a plastic alloy, or a hard alloy made plastic by excess of mercury, without a matrix, the result is very doubtful in many respects. For instance, where this method has been pursued, we generally find the interproximal space completely filled with amalgam, or a distinct, large, rough over-hang at the cervical margin, inviting and causing disease of the periodontal membrane and recurrence of decay. The filling of two approximating cavities at once, and then cutting the filling in two, is little, if any, short of mal-practice, and usually results in two bad fillings and a worse interproximal space, notwithstanding the claims of the exponents of this method to the contrary.

But let us proceed with what we consider to be the most successful and proper method. Suppose a cavity in the mesio-occlusal surface of any upper first molar prepared along the lines described, having first studied the occlusion and prepared the gingival wall and then applied the rubber dam. It is quite as necessary to keep the cavity dry for amalgam as for gold, and without the dam it is especially hard to keep it dry when using a matrix, as the gum will weep and capillary attraction will at times do the rest.

In case of too close an approach to the pulp, a cement covering would of course be indicated, the preference being given to Oxy-phosphate of copper; then varnish the entire cavity, margins and all, with Dr. A. C. Hewett's "Succinite" cavity lining, which will seal perfectly the dental tubuli, preventing any weeping therefrom; and as it is absolutely insoluble in water, it will effectually prevent the discoloration of tooth structure, and to some extent, decay of same, should you by some mistake get a filling that leaked. Its value over the margins can not be



questioned since it may prove the only barrier to decay, should a few of those little air bubbles happen to be along the margin. It also makes a sticky surface which will hold in place the first pieces of amalgam put in the cavity when working on an upper tooth. Having dried the varnish to some extent with hot air, a suitable matrix should now be adjusted and perfectly and closely adapted to the cervical margin by any means at the operator's command.

The alloy and mercury should now be carefully weighed out in the proportions definitely found to be correct. The proportion of mercury is not the proportion expected to remain in the filling, but the quantity necessary to completely unite all the alloy and allow for the expressing of the necessary surplus. Use just as little mercury as possible, so that the quantity expressed will not exceed two or three small globules. Weighing the proportions is our only means of securing uniform results. Too much stress can not be laid on the value of weighed proportions.

After weighing the alloy and mercury, place them in a small mortar, and by light and rapid stirring, incorporate one into the other. When incorporation is complete, turn the mass into the palm of the hand, having first carefully scrubbed that palm, and knead it with the thumb and fingers until a smooth plastic mass is produced. Now, by fairly strong pressure between the thumb and finger, express the surplus mercury and return to the palm and knead once more until the previous result is obtained. Then express the mercury again, and keep this up until by the exertion of the same pressure no mercury can be expressed and the amalgam creaks under the pressure. China silk of a heavy close weave may be used for the last pressure, as it has no lint nor fibers to become entangled in the mass, and is advocated by many, but too great a pressure should be avoided, either with pliers or otherwise, as it is possible to remove too much mercury, since a definite proportion is necessary to a perfect result.

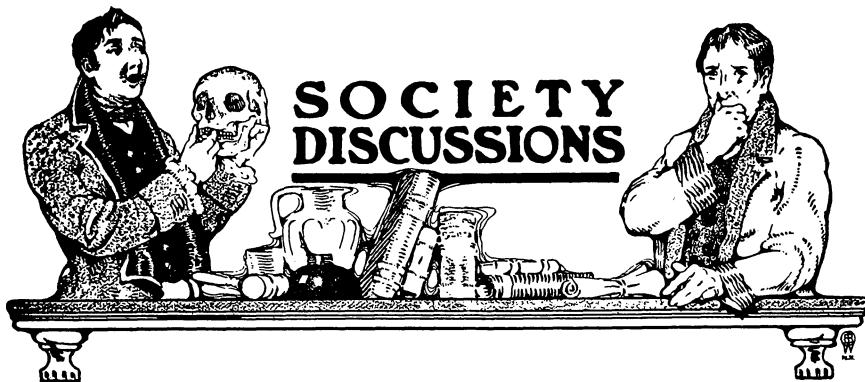
Place the mass on a watch crystal and with a thin-bladed instrument cut it into pieces of the desired size, preferably small pieces; then begin to pack immediately, as the amalgam will now begin to harden with great rapidity. Pack with as large, smooth and flat-faced instrument as will enter the orifice of the cavity, and pack with all the force the case will stand; even malleting may sometimes be resorted to with advantage. Pack along the walls and into the angles with a very small instrument. When the height of the step is reached begin and fill the step at the other end and work towards the marginal ridge, always removing any amalgam that becomes too plastic, through the forcing out of more mercury, and replacing it with fresh amalgam. Build the marginal ridge last. Pack the cavity a little over full, to allow for proper carving and finishing. In the course of ten minutes the mass will be hard enough to allow the

careful removal of the matrix, preferably in a lateral direction. Some slight carving may now be necessary on the approximal surface to remove the surplus that has squeezed between the tooth and matrix, and these margins should then be burnished carefully. Now, a few shreds of cotton are twisted into a loose rope and wet and passed through the interproximal space, and drawn back and forth over this surface lightly like a strip, being careful not to disturb the contact point. This procedure will give that surface a perfectly true, smooth face and remove all surplus over the margins as well as pieces of waste.

The occlusal surface should now be carefully carved to the proper articulation with the opposing tooth, and carved right down to the true margin all around, it being much easier to do now than to grind later. After having carefully wiped the whole surface over with a wet ball of cotton or spunk, to obtain a true and smooth surface, the patient is dismissed with instructions not to eat for one hour, and to return next day or when convenient, for final polishing. No filling should be regarded as finished until its every surface has a mirror polish. This polishing must be done by the use of strips, discs and plug finishing burs and will improve the margins, keep the filling bright and color good by preventing the accumulation on its surface of a film of debris to oxidize it. It is also highly essential that the approximating tooth should have a polished surface presented to it, to avoid the subsequent decay of its approximal surface, which otherwise would be bound to occur could a rough filling hold debris against it. In some instances it is necessary to re-polish an amalgam filling every few months as expansion occurs, some error having occurred in the manipulation; such possibly as the use of too green an alloy, by which is meant one that is insufficiently annealed. Remember that the well-annealed hard alloys will give the most satisfactory results.

I disclaim originality in this paper, and beg to acknowledge my indebtedness to many writers in our journals, and notably to Dr. M. L. Ward, of Ann Arbor, Mich.





Second District Dental Society March Meeting.

A meeting of the Second District Dental Society of New York, was held at Brooklyn, N. Y., on Monday, March 12, 1906. President Gould called the meeting to order. On motion the reading of the minutes of the last meeting was postponed.

President Gould then introduced Dr. M. H. Cryer, M.D., D.D.S. of Philadelphia, Penn., who read a paper entitled "Alveolar Abscess from the Anatomical and Surgical View-point."

Discussion of Dr. Cryer's Paper.

Dr. C. B. Parker. One of the points that interested me the most, was in connection with the use of peroxid, particularly in reference to the maxillary sinus and that it should not be used in that locality unless very highly diluted.

The second point was concerning the treatment of abscesses of the upper posterior teeth and the necessity of careful examination; in those cases where there is a recurrence more than once, you are pretty sure of having infection of the maxillary sinus.

The third was, that on general principles abscesses arising within the alveolar process, either by infection from the root or through other sources, should be treated in the same general manner as abscesses in other parts of the body, namely, by removing the source of primary irritation and infection and securing ample drainage. I think that is one of the most important things in this line of work, and then stimulating by proper medication so as to induce a healthy granulation.

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I am glad of the opportunity of reiterating a portion of what Dr. Cryer has said in relation to peroxid of hydrogen. Dr. Van Woert.

I am very strongly convinced and have been for a great many years that there is no preparation so generally used by the dental profession that does so much harm. Do not misunderstand me; it has its place, and a very important place in the practice of dentistry, but I do believe it is very far from being a safe remedy to use in irrigation for alveolar abscesses.

I remember distinctly a case I had many years ago; an alveolar abscess in the lower first molar on the right side. I followed at that time the teachings of men whom you all know; there was no drainage other than through the apices of the roots, and after I had cleaned it out as carefully as possible, I forced peroxid into the abscess. As a result in about two months all the teeth on that side were lost. I do not mean that peroxid can not be used for the irrigation of an abscess when conditions are favorable. If there is a fistula on the surface by which drainage can be complete, I doubt if there would be any damage done; nevertheless I believe it is safer not to use it for that purpose.

I am disappointed in that Professor Cryer did not give us something to use in its place. It is not for me to tell you what I use but I hope when he closes this discussion he will name a substitute for the peroxid.

Another phase of this question is the amputation of the roots of molar teeth in the maxilla. I have heard it said and I have read, and have seen all sorts of statements made, that it is as easily done as the amputation of a root of a first bicuspid, or premolar, as Professor Cryer puts it. I have yet to see the man who can amputate the root of a molar tooth in the maxilla with any degree of certainty that he is going to get it out without encroaching on the maxillary sinus. I have performed the operation with success, but it is rare that I undertake it, and would not advise it except as a last resort.

The advice to treat abscesses in the same way as they would be treated in other portions of the body, takes me back quite a number of years when I was in Philadelphia at the University of Pennsylvania and when Professor Garretson was alive. I gave a clinic there, not surgical, but in talking with him afterwards, I described a case I had. The subject was a young and very beautiful girl who had an abscess on a first molar and it was a question of either the loss of the tooth or facial disfigurement. Those of you who knew Professor Garretson know of his genial way and his readiness to help and advise and he said to me, "My boy, save that girl's face from disfigurement, save her tooth, use an aspirator, draw the pus off gradually and establish a drainage through the tooth". I followed those suggestions and was very successful, and



that is my practice to-day, to prevent facial disfigurement and save the tooth involved.

Dr. Russell.

Did I understand Dr. Cryer to say that abscessed teeth cause disease of the antrum?

Dr. Cryer.

One would suppose from the illustrations shown that they would, but a thorough investigation proves they seldom do so. A few years ago when making sections of the skull many decayed teeth were found and their roots were closely associated with the antrum—in a few cases there was direct communication from the root canals to the sinus. One of the reasons that an abscess seldom breaks into the antrum is that the inflammatory conditions of the tooth membrane stimulate the growth of new bone within the antrum over the point of the root; this, to a great measure, becomes self-protecting.

Dr. Russell. The reason I asked was that my experience seems to indicate that a great many such troubles were caused by abscessed teeth.

So far as abscessed teeth are concerned, my own view is, on general principles, that if a tooth discharges pus for two weeks it should come out, otherwise we are laying up trouble for the future.

I had a case of that kind a short time ago where there was a discharge of pus which grew worse and worse and the trouble seemed to extend up into the antrum. When I opened it up I was able to run an instrument upward and into the naso pharynx. I have taken that tooth out and the patient is now entirely well and I think that there are a great many such teeth which should be promptly extracted.

Dr. Jarvie. I always consider it a golden opportunity to listen to a paper by Dr. Cryer, and I never hear him read one but I carry away something of value.

Some years ago at Albany, before the State Society he presented a paper which had a large number of illustrations showing the irregular or uncertain position of the antrum, and it would seem that instead of having a fixed place where we might expect it, it may be in any place other than where we would naturally expect it to be. In the illustrations to-night we have seen the anatomy of the specimens somewhat different from what we might expect. For instance in one of the illustrations the antrum dipped down between the roots of a molar fully two-thirds of their length, and the section of bone was so thin at this place, that the least inflammation of it might cause absorption and an opening into the antrum. There were also illustrations showing how the pus might burrow to a great distance from the original point of starting, all of which impresses me with the great importance of the preventative treat-



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ment for alveolar abscess. In other words we ought to do everything possible to prevent conditions which invite alveolar abscesses by greater care in the treatment of roots and root canals because the least irritation at the ends of roots such as we saw in many of the illustrations shown on the screen might cause alveolar abscess which might soon extend into the antrum. What impressed me in the paper to-night perhaps as much as anything, is the great danger there may be in attempting to retain in the mouth abscessed teeth which do not respond very readily to treatment. The essayist said we very often make a mistake in attempting for too long a time to cure abscessed teeth and that where such teeth do not yield to treatment readily it is generally wiser to extract, because of the great risk that is being run.

Another point in the paper I will speak of and that is the use of peroxid. Peroxid is one of the most useful agents we have for washing out abscesses, but it must be used with some discretion. It is not wise to force peroxid of hydrogen into a blind cavity, for by doing so infection may be carried far beyond the then region of disease, even through the cancellated structure of the bone as in cases such as have been shown to-night. But where thorough irrigation can be had diluted peroxid is one of the most valuable agents we have.

[Dr. Lewis then read the discussion of the paper by Dr. Kirk of Philadelphia, which was in the form of a letter to Dr. Gould and is as follows :—

I find that circumstances prevent my being present to discuss Dr. Cryer's paper as I had hoped to be able to do and if it is not asking too much there are one or two points brought out by the essayist that seem to me to be of very great importance and which I should like to call attention to.

Dr. E. C. Kirk. First the note of warning which Dr. Cryer sounds regarding the injudicious use of hydrogen dioxid solutions for the destruction of pus and effete organic matter, products of inflammatory action in closed cavities or those with insufficient means of escape for the gas evolved by the dioxid when it is decomposed by contact with organic matter. The clinical evidence brought forward by the essayist is surely convincing enough to make us stop and examine closely into the mode of action of this valuable agent. The antiseptic, germicidal and detergent properties of hydrogen dioxid are clearly established and these are probably correctly attributed to the activity of the liberated oxygen in *statu nascendi*, i. e., while the gas is in the atomic state and before the free oxygen atoms have combined in pairs to form the ordinary molecular oxygen as it always exists when in the free gaseous state. Free oxygen in the molecular state has little or no germicidal power, at least as compared

with active or atomic oxygen, hence when produced in large quantities as an end product of the action of hydrogen dioxid on pus or dead organic matter it would serve, in the case of a closed cavity, to drive infectious matter beyond the range of disease action into healthy surrounding structures just as the essayist has shown. Hence for chemical and mechanical reasons as well as from the empirical ground of experience the use of the dioxid should be limited to free open surfaces and never be injected into closed or partially closed areas under conditions in which gas pressure would be generated.

The other point to which I wish to call attention and which to me is the feature of essential value of the paper is the point of view which the essayist has so well established and so logically defended. I have for many years been inclined to question the attitude of ultra conservatism that is held up as an ideal to be achieved in dental practice by teachers and writers generally in our profession. I would not be misunderstood in making this statement for a true conservatism I regard as the ultimate ideal of all efforts in the art of healing, but there is a true and a false conservatism, one which is rational because based upon a thorough knowledge of all the factors that make up the conditions of a given problem in pathology, and another or false conservatism which would save teeth at all hazards and without an adequate conception of what it may cost in damage to other structures to save a certain tooth alone for its own sake. The principle at stake in this matter was wisely expressed many centuries ago in the assertion "if thy right eye causeth thee to stumble, pluck it out and cast it from thee for it is profitable for thee that one of thy members should perish and not thy whole body be cast into hell," and I take it that modern surgery has no clearer or more rational statement of true conservatism than is embodied in this ancient saying. Applying the same thought to the presentation made by the essayist, his paper seems to me to have a peculiar value because, as the result of special training and wide experience, the writer shows conclusively by inference that the horizon of dentistry and the scope of view of its practitioners must be extended beyond the physical confines of the teeth and be made to include their related structures and the way these interact upon each other in a pathological way, and still further, comprehend how both are related to the structures and functions of the entire organism before we can be said to have attained that intellectual grasp of the whole of our legitimate field of activities that will enable us to establish and utilize that true conservatism in our judgments and our operations that those in whose service we are enlisted have the moral right to demand of us.

I personally feel grateful to Dr. Cryer for bringing out this interesting and, as I believe, very important aspect of the question upon which



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he has touched. It is a point of view which exemplifies to my mind the practical value of a course of medical and surgical training superadded to that of the dental practitioner and one which in my own belief could not have been so well brought out even if at all had the preparatory training of the essayist been in the reverse order.

Some of the points referred to this evening carry

Dr. G. Lenox Curtis. us from the anatomical to the surgical aspect of the subject, the one which interests me the most. He did not carry the subject of anatomy of alveolar abscess quite as far as I hoped he would; the lantern slides show but few results of the alveolar abscesses. I hope sometime he will present a paper that will bear strictly upon the subject, and will show a good many phases, many more perhaps than he did to-night; I think that such a paper would be very instructive to the dentist.

The bad results following the use of peroxid of hydrogen are by no means new; its deleterious effects, however, are well brought out in the paper. I had some personal experience with it in the early eighties. I soon found it important to have a very free drainage at the point of infection or exit. It seems to me the trouble lies largely in the fact that the opening is not sufficient to allow free escape. My principal use of it is in boiling out the debris while operating. I sometimes use it for diagnosing antrum disease. Very recently I used it in a case where I was obliged to demonstrate to a physician that the antrum was really infected. It was a case which had been treated as antrum abscess for several months; the treatment had been through a fistula above the roots of a second molar. After several months of treatment the tooth was removed. Peroxid had been used daily. I found that the mucous membrane on the floor of the antrum had been completely raised by the peroxid which had been forced into this fistula but had not entered the antrum. After opening into the antrum I injected into it a drachm of peroxid with the result that green pus of a most offensive character passed out through the antro-nasal orifice. This was convincing to the physician. The antrum was literally filled with mucomae and pus.

If I may, I will tell what I use for cleansing wounds; I either use a saline solution, say ten per cent or electrozone, one teaspoonful to half-pint of water; I prefer electrozone to all others. There is a certain proportion of ozone in it; besides, it is a germicide. I find it thoroughly safe and most effective. Very little force should be used in syringing wounds as the cell-making process is likely to be disturbed.

The question of infection of the antrum from abscessed teeth is one which frequently arises. I do not agree with some authors who claim



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that a large percentage of diseases of the antrum is due to nasal affections; I believe a very large majority of the cases is due to alveolar abscess, or septic roots, and this statement is made after twenty-five years' experience in treating this disease. While the abscess does not always penetrate the antrum or discharge into it, the septic influence of the putrescent pulp or the abscess surrounding it seeps, so to speak, through the mucous membrane into the antrum and infects it. Physicians and many dentists can not always diagnose septic teeth.

I think the dentist tries to save too many teeth for the patient's good. I believe in extracting teeth that are abscessed if the abscess can not be cured, but I believe that fully ninety-five per cent of all alveolar abscesses can be cured and the teeth saved.

I was especially interested in the last remark
Dr. LeRoy. made by Dr. Curtis. I had always thought it was necessary for the roots of teeth to penetrate the antrum, to have infection, but from what that gentleman tells us, evidently it is not necessary, but we may get a seeping of the infecting material into that cavity which will create disturbances such as we sometimes see.

We have all had experiences with abscessed teeth accompanied by antrum trouble and I think it is the best practice in these days to recommend such cases to some one who makes a specialty of such conditions. In some instances I have found the disease to respond very readily to treatment, and a very little treatment.

Perhaps we often indulge in over-treatment; I think, from the history I have read of those who have had antrum cases to deal with, that such has been the fault. If we would not treat these cases quite so much, or so powerfully, and let nature take its course, we would do better for the patient.

I have never had the experiences which have been indicated with reference to the use of peroxid, probably because I have been fortunate enough not to get into those closed cavities, rather than through any good management on my part, but I have learned that the use of it tended to destroy granular tissue and I have learned that good results are not obtained by its excessive use.

I wish first to offer my thanks for the kind spirit
Dr. Cryer. with which you have received my paper. A few questions have been asked and these I will try to answer.

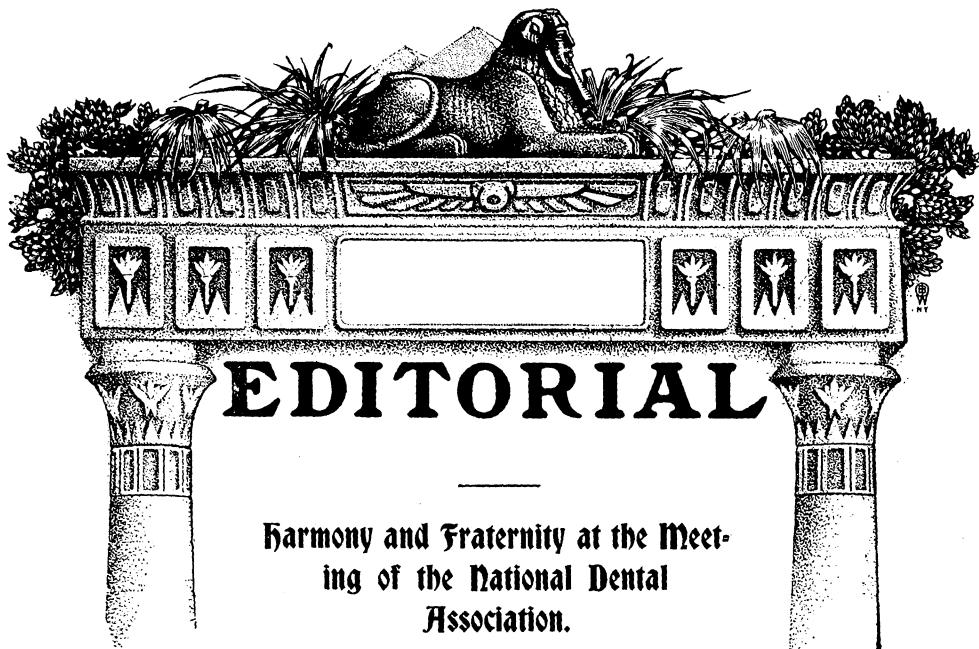
Dr. Van Woert asked what I would suggest in the place of hydrogen peroxid. I would prefer to use a carbolic acid combination or solution, or a boracic solution, or even a saline solution; it would depend somewhat on the condition of the abscess.



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Dr. Curtis kindly suggested that at some future time I should present a paper bearing strictly upon the subject of the diseased antrum as caused by the teeth, and show more cases than I have done to-night. In answer to this I would say that in all my dissections of over a thousand skulls I have not found more than a dozen cases where I could say that the antrum had become diseased from the teeth. Those who practice oral surgery might naturally conclude that there are a great many such cases, because most of them are referred to the oral surgeon by dentists, physicians and rhinologists; my early experience leads me to believe such to be the case, but after a more careful study of the skull, particularly of the pneumatic spaces, it was found that these regions included such a large area of mucus-covered air spaces and that they are divided into so many sinuses, cells, recesses and pockets, that they are liable to become diseased from infection which passes from one air space to another and as the maxillary sinus is the lowest of these pneumatic spaces, with its outlet at the top, it is more than likely to become diseased from infection and deposits from the spaces that are above. The nerves and blood vessels that supply the teeth pass along the floor of the maxillary sinus, not within the bone as described in many of our text books on anatomy. This being the case the nourishment of the teeth is impaired and the teeth become diseased, so that I believe there are many more teeth lost through infection of the pneumatic spaces than there are sinuses infected from teeth.





The Atlanta meeting of the National Dental Association was a crisis in the history of that body, and the profession at large will be gratified to learn that the period has passed leaving the Association with a brighter prospect than ever before.

The work of the sections was more satisfactory than at any previous meeting, due to the fact that each section in turn was given the use of the main meeting-hall, so that there was no conflict of programs. Thus authors met larger audiences and the discussions were freer and fuller. Some very good papers were offered and the literary part of the work may be said to have been an advance over other years.

**The Spirit of
Harmony and
Compromise.**

But the chief good was attained behind closed doors, and will not become fully apparent except as the months roll by, and it be discovered that the warring factions in the National have really buried

their personal differences, and will adhere to the compromises agreed upon. If this be done, and all members hereafter work in harmonious unison, there is every prospect that the Association may become National in character as well as in name.



There is no disguising the fact that a number of men journeyed to Atlanta with bitterness in their hearts and unyielding determination to have themselves and their personal views upheld at all costs. The chief matters of dispute fell under the supervision of the Executive Committee, and it is not too much to say that the members of the Executive Committee martyred themselves in an effort to terminate the disputes, to avoid public scandals, and withal to restore harmony, while at the same time leaving each contestant his self-respect and a feeling that impartial justice had been administered.

In all cases the disputants were made to see that they must accept compromise or be prepared for rigid discipline, should further investigation show that it might be merited. But above all an appeal was made, that private grievances should give way, in order that the good name of dentistry should not be smirched by scandals.

The members of the Executive Committee so devoted themselves to this herculean task, that whole nights were spent in reading documents, and whole sessions given over to hearing evidence. In the end they succeeded in every instance in finding for all a compromise which could be accepted with honor. And so, if the pacified but remain pacific, and all pledges be kept, a season of harmony and united effort is dawning for the National Dental Association. And if this dawn should develop into a brighter day, it must never be forgotten that the clouds were swept away at Atlanta by the splendid zeal of the men in the Executive Committee.

Without detracting an iota from the value of **Fraternity.** the services rendered by the Executive Committee,

there unquestionably was a subtle force at work which largely contributed towards the outcome, and the one word which symbolizes that force in all its manifold expressions is the word "Fraternity." Two college Fraternities were largely represented, while nearly a hundred men wore the pin of the Interstate Dental Fraternity. This body was especially organized only four years ago with the chief purpose of disseminating a broader feeling of sociability and brotherly love at the annual meetings of the National Dental Association. The Asheville, St. Louis and Buffalo meetings were all very successful in promoting this object, but the Atlanta banquet was singularly potent in its immediate effect.



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When the members sat down at the dinner, no sort of settlement of the secret strifes had been found, nor seemed possible, and a suppressed restlessness impregnated the air. But the urgent appeals of the evening's speakers for fraternal feeling, and fraternal action; for suppression of self, and forgiveness of wrongs, touched the hearts of all, and compromise immediately became possible; nay, was assured. The psychological moment was reached when the last speaker, Dr. Hetrick, with impressive oratory preached optimistically of the future, and asked that all gods should be forgotten, and that all should soar with him into the higher ethers where there is but one God over all; that God which breathes only universal love. As the members rose and united in softly singing "Auld Lang Syne," all felt the inspiration of a Presence, which softened and united all hearts, and those who had known him best, and missed him most, guessed that the departed Chappelle was with us in spirit.

May harmony and brotherly love continue to prevail and may the future usefulness of the National Dental Association increase with passing years.





THERE IS AN OLD ADAGE, or if there is not there ought to be one, which ♦ says: "A fortune can not be made with two hands." Not unless you ♦ steal it; then maybe one hand would do if it were big enough. ♦ ♦

WITH THIS THOUGHT in mind I have recently been studying the trend ♦ of events. "Trend of events" is not half bad. What? Well, any way, ♦ as I was about to say, I have formulated a new Dental Code, the prin- ♦ ciple (or lack of principle) of which is: "Why should I work with two ♦ hands, when I can have two, four, or maybe six hands to work for me?" ♦ Or the same thing in less words would read: "Why should I work ♦ myself, when I can work others?" ♦ ♦

ACCORDING TO THE OLD CODE, a man works for what he gets, and ♦ occasionally gets what he works for; though not always. By the new ♦ scheme he gets all that and more, and the secret password to dental ♦ affluence these days is "Commissions." ♦ ♦

GENTLE READER, are you getting any commissions? If not, you are not ♦ up to the times. Are you paying out any commissions? If you are, you ♦ are ahead of the times. Of course, I am taking it for granted that you ♦ are just a dentist; an ordinary, every-day dentist, not a sp̄ecialist. With ♦ specialists it is different; at present they have little choice. ♦ ♦

I HAVE BEEN TOLD that there are two horns to a dilemma; and sure ♦ enough here's your dilemma, with two horns; and if you tackle the ♦ beast you'll find that both horns are tipped, and that the tips are gold; ♦ though sometimes checks are accepted. ♦ ♦



ITEMS OF INTEREST

LOOK YOU HERE, BROTHER! Is there a rule which will satisfy your ♦ conscience when the question is one of receiving good coin of the ♦ realm for your own pocket, but which same rule would seem less ♦ applicable were it a question of paying out like sums under like circum-♦ stances? Verily, I say unto you, it seemeth so! ♦ ♦ ♦

YOU WOULD HAVE ME speak more plainly? Have at you then! Can ♦ you tell me, Friend, why you should be entitled to a commission for ♦ recommending patients elsewhere, when you have never paid any com-♦ missions to those that have sent patients to you? And what sort of ♦ rule is that which, like a bad waltzer, can not reverse? ♦ ♦ ♦

YOUR APPOINTMENT-BOOK is full. You have all you can do. Yet a ♦ Fellow comes in with a broken jaw. Bothersome, isn't it? Nasty sort ♦ of cases anyway. Besides, you never have set a jaw yourself. Do you ♦ tell the man that? I guess not! Not that you object to his knowing how ♦ little you know; but, then, he might tell others, and they, not knowing ♦ better, might think that you know less than you really do know. And ♦ that would be embarrassing. ♦ ♦ ♦

SO WHAT DO YOU DO? At least you can advise the man. So you advise ♦ him to go to Dr. Surgeon. Then you refuse his proffer of pay; your chest ♦ swells up, and with a magnanimous wave of the hand you say, "Not at ♦ all, my man! Not at all! I have not earned any fee! I have done ♦ nothing for you." And, for once at least, you tell the truth. ♦ ♦ ♦

BUT SEE HERE, YOU! If you haven't earned any fee when you give the ♦ man that advice, and Dr. Surgeon cures him, when do you earn a fee? ♦ And if you do not earn a fee, why do you take one? Or is it different ♦ if you call it a commission? I guess it must be! ♦ ♦ ♦

AT ALL EVENTS, when Dr. Surgeon collects his hundred, and sends you ♦ a crisp twenty, you take it. Under the circumstances, when folks ask ♦ you, "Why do you not practice oral surgery?" you answer, "I have ♦ only two hands." And then you smile. Of course you smile. Why ♦ shouldn't you smile? The joke is all on Dr. Surgeon. ♦ ♦ ♦

THE OTHER FOLKS don't know why you smile, but then so few Fellows ♦ nowadays have any real appreciation of humor. Besides, they do not ♦ fully grasp the reason of your smile, because you do not mention about ♦ those commissions, nor about those other two hands doing surgery ♦ for you. And this forces me, positively compels me, to ask you a ques-



ITEMS OF INTEREST

* * * Question: "If it is absolutely moral and ethical to accept commissions, why do you keep the fact a secret?" Ah! Why indeed! Of course you know the statute. If it would tend to degrade or incriminate you, you need not answer. * * *

* * * AND I RATHER THINK it would, especially if the patient should hear you. * * *

* * * WE MIGHT OVERLOOK the surgery business, with its little emoluments, if that were the end of the story. But it isn't, more's the pity. I rather think it was the beginning of the narrative, and that it was some of the Fellows in the other lines of surgery that first tempted Us; Us that love to call ourselves Dental Surgeons! * * *

* * * AT LEAST THE FIRST genuine case of commissions known to me implicated a medical oral surgeon; one that never had been a Dentist Fellow at all. He was very fond of reading papers to dentists, and he hasn't entirely given up the habit yet. Well, one day a Dentist Fellow sent him a patient in good faith, and after it was all over, that Medical Fellow forwarded a check for just twenty per cent of the bill. The Dentist Fellow at first remonstrated, and sent the check back, saying he had not expected any commission. But the check once more traversed the mails with this message: "Let us call it an honorarium." And they let it go at that. * * *

* * * YOU SEE, IT DOES make a difference how you put things. To that Dentist Fellow a commission was nauseous, because it sounded so commercial. But an honorarium! Why, dear me, professional men have taken those things since Kingdom Come, whenever that was. That, as I say, was the entering wedge. Nowadays the Medical Fellow just sends twenty per cent, and the Dental Fellow he just accepts twenty per cent, and they don't ask one another whether it is commission or honorarium. Why bring up unpleasant discussions? There never is any profit in then; not compared to twenty per cent. * * *

* * * BUT, AS I HINTED, it has not stopped here. The habit is growing, and it is growing just as fast as dentistry is dividing up into specialties. Every now and again some Dentist Fellow gives up dentistry as a whole, and comes to some big town to practice a specialty. Maybe it's Prosthodontia, or maybe it's Orthodontia; or again it might be Extraction of teeth, or Prophylaxis. Whichever it is, here's about what happens:



ITEMS OF INTEREST

⊕ The Specialist Fellow calls on all the biggest Dentist Fellows in the town; all those that he had heard about away back in his own woods. ⊕ And he tells this Crowd what his game is, and they egg him on. First, ⊕ though, they make sure that he is not going to do any regular dentistry. ⊕ They make him say, "No Dentistry for me; Honest and True; I cross ⊕ my Heart. Ene, mene, miny, Mo!" or some other equally qualified oath. ⊕ After they have him fixed along those lines they advise with him on the ⊕ commission question. And they advise him to give commissions. To ⊕ give commissions to them. *

AND THE QUEEREST part of the whole business is that the most ⊕ prominent men, the ones with the largest practices, the best homes and ⊕ the fattest bank-accounts, are frequently the very ones that recommend ⊕ this commission business, with themselves on the recipient end. Oh, ⊕ well, I guess that's how they got their fine houses and things. *

FOR DON'T YOU SEE, that if a Dentist Fellow can work all day with his ⊕ own hands, at high prices; and if he can have two expert hands doing ⊕ prosthodontia for him on commission; and two more doing orthodontia; ⊕ and two more doing his surgery; and two more taking his pyorrhea cases, ⊕ and all sending him twenty per cent commission, that he is really a ⊕ silent partner in a good thing? Yea verily, a very silent partner!

THIS SORT OF commission-merchant brings to mind the story of the old ⊕ negro Door-keeper in the Capitol at Washington. One day when a ⊕ warm debate on the question of Mormonism was agitating the country, ⊕ he stopped an old Senator and asked: "Senator, would you please, sir, ⊕ most kindly tell me what is a Mormon?" The Senator replied: "A Mor- ⊕ mon is a man with twenty or thirty wives." At once he was startled to ⊕ hear the aged negro cry out, "Lordy! I wish I was a Mormon!" "And ⊕ why so, you old sinner?" queried the Senator. "Well, sir," replied ⊕ George Washington Quincy Adams, "I has one wife now, and she helps ⊕ quite a mite, takin' in washin'. If I had twenty or thirty wives, I'd run ⊕ a steam la'ndry, and I could spin roun' Washington in one o' them ⊕ motion cars." *

BUT JUST SUPPOSE a case! Just let us suppose that a plain, ordinary ⊕ physician some day, having recommended a patient to Dr. Hightone, ⊕ should whisper "Commissions"? What do you think would happen? ⊕ Do you think that M. D. would get his little twenty per cent? Say ⊕ now! Here's a chance for a bit of fun. Why not get some physician to ⊕ test the thing out? Gee!! *

I HAVE HEARD of a physician, a nice, sympathetic sort of man. If he ♦ should attend you, and you should die—which Heaven forbid—he would ♦ grieve with your family, and comfort them and be as helpful as he ♦ could at that sad time. He would recommend an Undertaker; and, by ♦ the way, that Undertaker is really a good Undertaker. He understands ♦ his business right down to the ground, and even under the ground. ♦ He'll bury you so thoroughly that you can't come back. For, as with a ♦ certain brand of imitation coffee—"there's a reason." ♦ ♦

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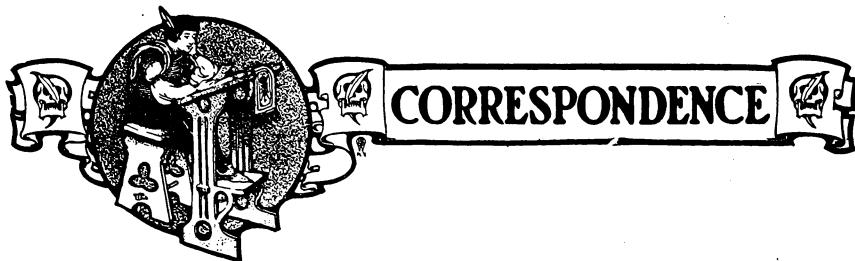
BUT AFTER YOU get to Heaven—that's where you are going of course— ♦ suppose you should discover that your widow had paid a pile to bury ♦ you, and that the Undertaker chap had sent twenty per cent commission ♦ to that Doctor Fellow, as he always does? Say! wouldn't your Heavenly ♦ halo fret your brow? Wouldn't you want to haunt that Doctor Fellow, ♦ at least on Hallow-e'en? And wouldn't you apply for a leave of ab- ♦ sence from the Angel business so you could visit with him—just once?

• • •

YET WHAT'S WRONG ABOUT IT? You took commissions yourself, ♦ didn't you? And the Doctor-Undertaker combination is on the same ♦ general idea, isn't it? The same principle (or lack of principle) is in- ♦ volved, don't you think? Very well, then! Keep your halo on! What ♦ makes your ghost so restless? ♦ ♦

The Pessimist.





Interchange of License Advocated.

Editor ITEMS OF INTEREST:

Dr. John S. Marshall writing from the scene of the late San Francisco disaster tells a woeful tale of pitiable condition in which the several hundred dentists of that stricken city find themselves with offices destroyed, patients scattered and what money, if any had been accumulated tied up in banks. Many of them will be obliged to take up the pick and shovel as suggested in this same article.

It is deplorable indeed that our brothers have lost everything and must work along other than professional lines to get the bare necessities of life for their loved ones, or possibly, forsake for ever their chosen profession.

It will be years before San Francisco can boast a population large and prosperous enough to support the number of dentists that existed within her confines before this disaster. But few can find maintenance along professional lines now. What then will become of the mass of the dentists, and what will they do? The idea suggests itself that they might leave San Francisco, even depart from the borders of California, and scattering throughout the States and Territories find remunerative employment along the lines of their chosen profession. Should they attempt this what would be the result? A halt is called. They find themselves rigidly quarantined. A strong line is drawn between the State in which they have been practicing, and every other State and Territory in this so-called free republic. Have they some dread disease that they are thus debarred from intercourse with their fellowmen and deprived of the freedom of their native land?

No! They are met by a State Board of Dental Examiners who demand their passports. Failing to produce these, they are warned to proceed at their peril. From a professional standpoint, they may have been regarded in the State in which they have been practicing as men of the highest culture and attainments, but failing to pass the requirements of a State Board they are driven back, either to abandon dentistry and



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live, or to cling to it and endure a miserable existence. In approaching these State Boards a small percentage only, and these but very recently from college, could pass a satisfactory examination. Very few eminent professional men, even teachers of recognized ability in our leading colleges, would have the temerity to try an examination before one of these boards. If a man elects to teach successfully any one branch of learning, he must devote his time and energies exclusively to that branch. Hence no man, no matter how astute his mind, could after years of devotion to a single branch of knowledge, hope to pass successfully a technical examination on all branches pertaining to dentistry or medicine, or any other special scientific course.

Some modifications of former existing laws have been made it is true, and still others are planned and being worked for, but we are yet far from a realization of an ideal law, a law which when enacted will be universal in its application of justice to all. The predicament in which our professional brethren of San Francisco find themselves affords it seems to me the broadest kind of an object lesson along the lines of interchange of state license, or the abolishment altogether if need be of the State license, for one of universal application, the possession of which would carry with it, the privilege to practice in any State or Territory of the Union.

Here are several hundred of our brethren absolutely deprived of the right to practice the profession in which they are acknowledged to be skilful and competent to serve their fellow men; their clientele scattered to the four winds, or silent in death, themselves quarantined and disqualified from taking up their professional work elsewhere. These conditions should not exist. California is not less guilty in this matter than are the other States. Had she leaned toward reciprocity, how different it might have been with her to-day!

Let us rise *en masse* and so shape the trend of thought in our society meetings, and in the literature of our journals, that it shall give rise to a legislative action that will ultimately bring about a sane and healthy condition of affairs. We claim to be a liberal profession. In no other way can we better demonstrate our claim to that exalted position than by speedily bringing about the condition of affairs suggested and forever ridding ourselves of the stigma that has so long blotted the fair name of our profession. Let us have reciprocity. Adopt the Asheville resolution.

W. W. FREEMAN, D.D.S.

Norfolk, Va.



A Few Impressions.

Editor ITEMS OF INTEREST:

While it is very interesting to read the reports of some of the discussions, which rarely discuss, but almost always relate incidents of office practice, it would be more satisfactory if some conclusions were reached through demonstration, that do not hide behind a flow of words, which are subject to several different interpretations.

Fostering delusions which destroy the judgment seems to afford a great many dentists the most exquisite happiness. The elasticity of the English language gives to man the opportunity to express his delusions convincingly, and the desire to be considered superior to others, makes him believe that every assertion he indulges is a demonstrated fact, reached by unfailing tests, and exhaustive analysis.

These impressions are forced upon me by reading

Simplicity of Root Filling. the paper of Dr. Shields, and the following discussion in the August number of ITEMS OF INTEREST.

It is such a simple thing according to this paper to ascertain the exact length of a canal, and place a particle of gold at the apex, neither slightly above nor below that point, that we should be able to do it intuitively.

Of course it can be done when the tooth is in the mouth, regardless of the size of the canal, or its tortuous course; but when the tooth is held in the hand this method of procedure seems to fail. I know the answer is to the effect that it fails, because the one filling the canal of the tooth in the hand is greatly deficient in that fine sense of touch possessed by those who measure canals, by bending the point of a broach to a right angle, then passing it into the canal beyond the foramen, and drawing it back until the hook rests upon the apex of the root, when the broach can be marked with a file, so that the exact length of the canal is known. This method abolishes the speculative feature of filling canals, and that part of dentistry becomes an exact science; as simple as measuring a board with a rule.

Delusions are sweet; therefore let no man discard them. If one takes a hundred teeth in his hand at different times, the canals of which can not be filled to their apices, let him forget it, and say to himself, that failures never occur when the teeth are in the mouth.

For the sake of pastime, delude yourself into the belief, that the teeth in the mouth have canals slightly different, or the sense of touch is more acute, than the eyesight which can be more accurately used with the teeth in the hand. In other words nourish your delusions by destroying your judgment, and be happy.



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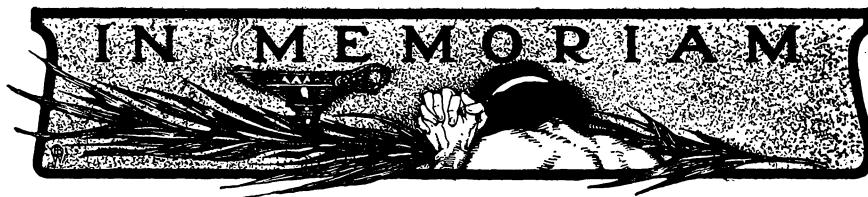
When teeth after their canals have been filled, give no trouble to the patient, attribute the fact to manipulative skill; but when the patient says the teeth are sore or painful, just remark: "It can not be so; you must be the victim of a morbid imagination."

So many different methods of filling canals have been presented to dentists, that no man should be without a method suited to his particular fancy. Each has its supporters, and judging from each one's statement, the method he employs is the best. It should not be forgotten that all of these methods are common property; but one would think when hearing them lauded by their defenders, that they originated with them, and had been worked out by them, to a satisfactory conclusion. In reading of the remarkable results attained by some operators, in filling canals, the idea forces itself upon me, that these men must be endowed with some especial genius, by which their efforts are rewarded with unalloyed perfection, and the filling of canals no longer contains an element of speculation, but is exact and absolute; consequently no canals need be imperfectly filled except by a novice. I often wonder if, when these dentists operate, the saliva flows, or blood follows the removal of a pulp. I think sometimes the patient's breath refuses to evaporate, so that moisture may not be deposited upon the mouth-mirror even though the rubber dam be not used.

No matter how many times a theory has been proven false, its idolaters cling to it, lavish affection upon it and refuse to listen to stories circulated about it. All of which is strong evidence that delusions are sweet and must not be dissolved by iconoclasts.

W. H. DUDDY,
Boston, Mass.





Dr. Charles C. Chittenden.

Resolution

WHEREAS, The hand of Providence has removed from us our honored member and active co-worker, Dr. Charles C. Chittenden, and

WHEREAS, In his decease we have suffered the loss of a member who had an active interest in this society, and who had the welfare of the entire profession at heart; therefore be it

Resolved, That we, the members of the Southern Wisconsin Dental Association, in annual session in Milwaukee, this 31st day of May, 1906, express to the members of his bereaved family our sympathy and sorrow in their affliction and assure them of our admiration for his high personal ing professional qualities, and

Resolved, That these resolutions be spread upon the records of this Association, a copy sent to the family of our departed member, and copies sent to the Dental Journals for publication.

E. J. HART, P. B. WRIGHT, CHAS L. BABCOCK,
Committee.

Dr. William Kay.

Dr. William Kay died, aged 34, of acute dysentery at his residence in Philadelphia, Pa., on Monday, July 23, 1906, after a week's illness. Dr. Kay was born and received his early education in Dumfries, Scotland; and was also six years in the office of the late Dr. Wood of Dumfries. He came to this country in 1892; in 1893 he entered, and in 1896 graduated from the Philadelphia Dental College. Since then he practiced in Philadelphia. In 1899 he became Demonstrator of Operative Dentistry, and in 1904 demonstrator of Crown and Bridge work in the Philadelphia Dental College. He was a member of several dental societies and sometimes gave clinics at meetings of same. He was buried on Thursday, July 26, 1906, at Woodland Cemetery, Philadelphia.

The doctor leaves a widow and three small children and a large circle of friends to mourn his loss.



SOCIETY ANNOUNCEMENTS

National Society Meetings.

American Society of Orthodontists, New York,
December 27, 28, 29, 1906.

Institute of Dental Pedagogics, Chicago, December
27, 28, 29.

Sixth District Dental Society.

The Thirty-eighth Semi-annual Meeting of this Society will be held at Cazenovia, N. Y., on Friday and Saturday, October 5 and 6, 1906. An interesting program will be provided and a dinner will be served in honor of Dr. A. M. Holmes of Morrisville.

Kindly cross off the dates in your appointment book now, and if possible arrange to attend this meeting.

FRED FORD, Secretary.

Northeastern Dental Association.

The Twelfth Annual Meeting of the Northeastern Dental Association will be held in Horticultural Hall, Boston, Mass., October 17, 18 and 19. This meeting held in Boston can and will be made a great success. The talent for both essays and clinics is of a high order and plenty of it. The exhibits also promise to be elaborate and interesting. Please remember the dates. An invitation is extended to all ethical members of the profession to attend.

EDWARD O. KINSMAN, Secretary.

THOMAS J. BARRETT, President.



Southern Illinois Dental Society.

The Annual Meeting of the Southern Illinois Dental Society will be held in Centralia, October 23 and 24, 1906.

The Chairman of the Executive Committee assures us an excellent program, and that a number of essays and clinics, both interesting and profitable, are to be reserved for this occasion. An interesting feature of the meeting will be a banquet.

A most cordial invitation is extended to all ethical members of the dental profession.

HARRY K. BARNETT,
Secretary.

The Central Nebraska Dental Society.

The Central Nebraska Dental Society was organized March 16, 1906, with the following officers: President, Dr. W. V. Sharp, Stromsburg; vice-president, Dr. Geo. Gallagher, Atica; secretary and treasurer, Dr. Homer Hatfield, York. The best of feeling prevailed with a good attendance. The next meeting will be held in Seward, October 16 and 17. All ethical dentists are cordially invited.

W. V. SHARP, President.

Southern Nebraska Dental Society.

The first meeting of the Southern Nebraska Dental Society was held in Red Cloud, Nebraska, August 30. The following officers were elected: Dr. Frank Nelson, Superior, president; Dr. J. N. Prime, Oxford, vice-president; Dr. W. A. McHenry, Nelson, secretary and treasurer. The next meeting will be held in Superior, Nebraska, November 14, 1906.

Wm. A. McHENRY, Secretary.

New Jersey State Dental Society.

The following officers were elected for the ensuing year: M. R. Brinkman, D.D.S., president, Hackensack, N. J.; Walter Woolsey, D.D.S., vice-president, Elizabeth, N. J.; Charles A. Meeker, D.D.S., secretary, 29 Fulton St., Newark, N. J.; Herbert S. Sutphen, D.D.S., asst. secretary,



14 East Kinney St., Newark, N. J.; Dr. Henry A. Hull, treasurer. Executive Committee: Walter Woolsey, D.D.S., chairman, Elizabeth, N. J.; W. A. Jaquette, D.D.S., Salem, N. J.; Harvey Iredell, New Brunswick, N. J.; Frank G. Gregory, D.D.S., Newark, N. J.; C. H. Dilts, D.D.S., Trenton, N. J. Membership Committee: Wallace F. Naylor, D.D.S., chairman, Somerville, N. J.; B. L. Rhome, D.D.S., Asbury Park, N. J.; C. P. Tuttle, D.D.S., secretary, Camden, N. J.; G. L. D. Tompkins, D.D.S., Asbury Park, N. J.; F. K. Heazelton, D.D.S., Trenton, N. J.

Texas State Dental Association.

The Texas Dental Association held a very successful meeting at Galveston, June 14, 15 and 16, with one hundred and fifty members present. The following officers were elected: Dr. R. D. Griffis, Paris, president; Dr. A. A. Dyer, Galveston, 1st vice-president; Dr. C. G. Edge, Houston, 2d vice-president; Dr. G. W. Staples, Dallas, secretary and treasurer; Dr. A. P. Sonntag, Waco, curator. Executive Committee: Dr. C. J. Smith, Austin, chairman; Dr. C. L. Watson, Mexia; Dr. J. W. Combs, New Braunfels.

Michigan State Dental Association.

The semi-centennial convention of the Michigan State Dental Association was held at Detroit, Mich., July 9, 10, 11. The following officers were elected for the ensuing year: A. L. LeGro, Three Rivers, president; E. B. Spalding, Detroit, vice-president; L. N. Hogarth, Detroit, secretary; J. Ward House, Grand Rapids, treasurer; Geo. Zederbaum, Charlotte, to fill vacancy on the board of trustees.

Southern California Dental Association.

The Southern California Dental Association will hold its ninth annual session in Santa Barbara, Cal., Oct. 8, 9, and 10.

CHAS. M. BENBROOK, Secretary,

455 So. Broadway,
Los Angeles, Cal.



New Jersey State Board of Registration and Examination in Dentistry.

The New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual meeting to examine candidates in the State House, Trenton, N. J., beginning Monday, December 10, and continuing through the 11th, 12th and 13th. Sessions begin promptly at 9 a. m.

Practical and theoretical work completed at this session.

For information apply to the secretary, Charles A. Meeker, D.D.S., 29 Fulton Street, Newark, N. J.

All applications must be in the hands of the secretary ten days prior to the meeting.

CHARLES A. MEEKER, D.D.S.,
Secretary.

Connecticut Dental Commissioners.

The Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford, on Wednesday, Thursday and Friday, November 7, 8 and 9, 1906, to examine applicants for license to practice dentistry, and for the transaction of any other business proper to come before said meeting.

All applicants should apply to the Recorder for proper blanks and rules for conducting the examination. Application blanks must be filled in and sworn to, and with fee, filed with the Recorder on or before November 1, 1906.

By order of Commission.

GILBERT M. GRISWOLD, Recorder,
783 Main St., Hartford, Conn.

Idaho Board of Dental Examiners.

The Idaho Board of Dental Examiners will meet in Boise, December 27, 28 and 29.

C. E. M. LOUX, Secretary.

Pocatello, Idaho.